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Textile World

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13TH ANNUAL RAYON Textile World YEAR BOOK NUMBER

September, 1937

300 Million Mark

Will be passed by rayon this year

—But the real drama lurks elsewhere

By Douglas G. Woolf

WE recall the forebodings of the wise guys back in 1920 when the domestic production of artificial silk exceeded 10,000,000 lb. for that year. That sort of thing just couldn't last, that was all! Why, the output had almost doubled in two years! So the men on the inside—those who really know about such things—held their fingers to their ears and waited for the crash.

They are still waiting.

This year, the annual production of rayon in this country will approximate 325,000,000 lb. We are not very good at percentages when they get into big numbers but it is our impression that that means more than a 3,000% increase over the inflated, unsound, and thoroughly absurd production in 1920.

And, by the way, the above 1937 figure does not include the staple fiber production which contributes many million additional pounds to the picture.

However we haven't even approached the real climax of our story. Impressive as those millions are, they are small-time stuff compared with something else that has happened this year.

Our mind goes back again to the wisdom of those sages who had this artificial silk business all figured out in 1920. Why the darned stuff almost dissolved in water! What could you do with a fiber like that? Nothing, obviously.

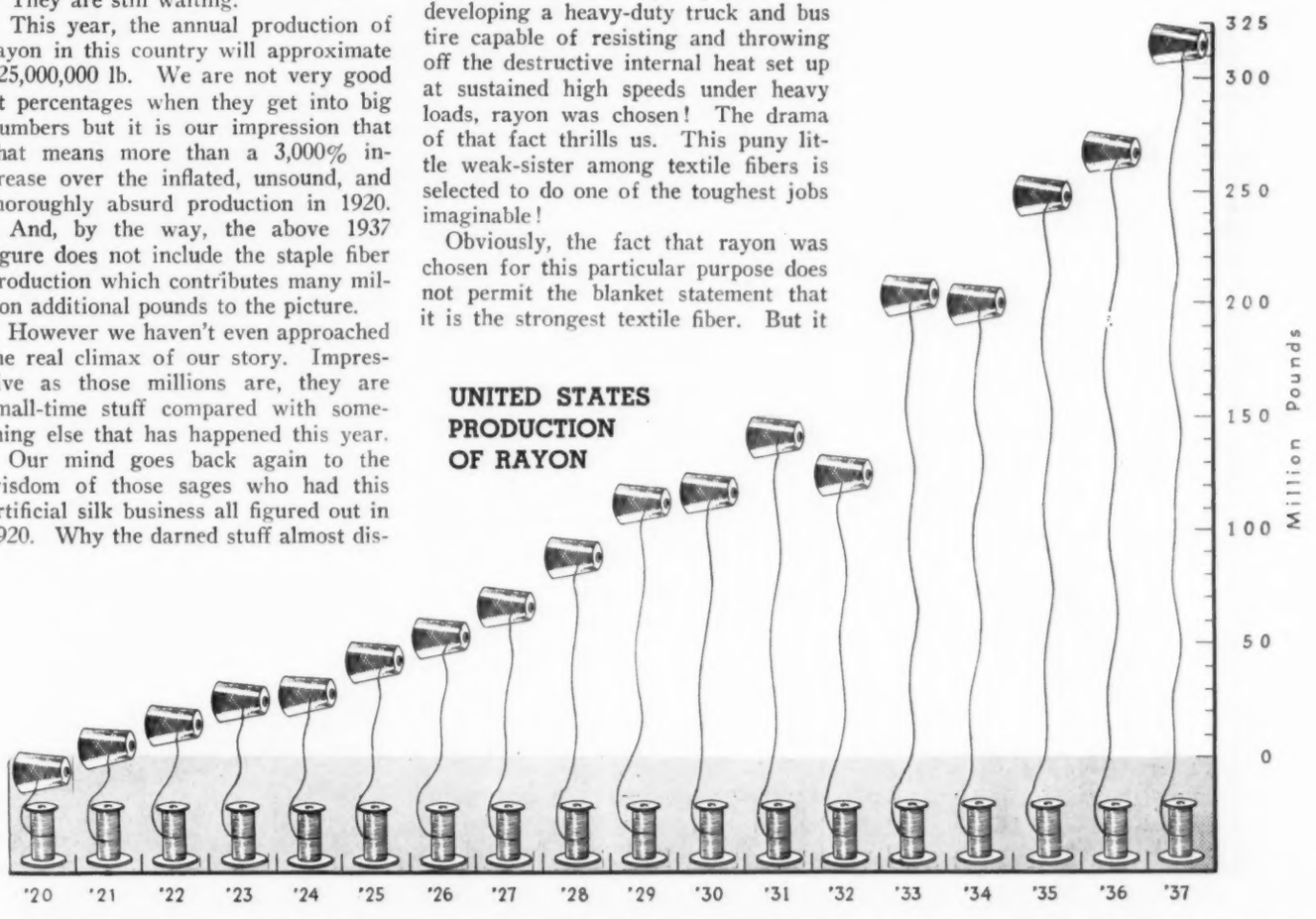
Or almost nothing, that is. One little use was found for it this year. After 10 years of experimental work by tire manufacturers and rayon producers in developing a heavy-duty truck and bus tire capable of resisting and throwing off the destructive internal heat set up at sustained high speeds under heavy loads, rayon was chosen! The drama of that fact thrills us. This puny little weak-sister among textile fibers is selected to do one of the toughest jobs imaginable!

Obviously, the fact that rayon was chosen for this particular purpose does not permit the blanket statement that it is the strongest textile fiber. But it does permit a little insight into the minds of the 1920 scoffers.

What was wrong with their calculations? After all, they were not a bunch of morons. Many otherwise intelligent men were included in their number.

The trouble was an old one: They didn't take science into their figuring.

Years ago, at the very beginning of



the rayon impetus, we stated that there was no limit to what the chemist and the engineer, working together, could do to the then "artificial silk." Many of the best minds thought that was just another editorial saying—one of those things that sound good but don't mean an awful lot.

Some day, the financial man may learn his lesson—and get the habit of looking around the laboratory for some dollars-and-cents information. The last 17 years in rayon represent perfect case-study material for him to start on.

Staple Fiber Growth

We mentioned staple fiber a little while ago. This is the other big story of the year. In fact, although the tire development is more spectacular, the rise of staple is potentially more important.

It will be recalled that last year 12,400,000 lb. of staple were produced in this country, against 5,200,000 lb. in 1935, and 13,000,000 lb. were imported last year against 1,500,000 lb. in 1935. In other words, the total 1936 consumption was approximately 25,000,000 against 6,700,000 in 1935—nearly four times as much.

Where it will stop, nobody knows. The best dope is that this is only the beginning—and that it's a little early to talk about a stop just now.

Staple fiber production figures for thus far this year are not available yet —and will not be until after the end of the year. An estimate of at least 20,000,000 lb. total annual output should be conservative (against 12,400,000 lb. last year). Imports of staple fiber for the first half of this year were at a monthly average rate over twice that of the whole year 1936. If this ratio continues, 1937 imports will approximate 27,000,000 lb. (against 13,000,000 lb. last year). The total consumption of staple fiber, then, would be 47,000,000 in 1937, against 25,000,000 lb. in 1936.

Forty-seven million pounds of staple rayon! The total is staggering. Five years from now, it is safe to predict, that 1937 total will seem picayune in retrospect.

The importance of this whole development has been great enough to impel us to devote a major section of this Annual Rayon Number to rayon staple.

What a Year!

Thus far, 1937 has been a manufacturer's dream-year in rayon. Production sold ahead, stocks at a premium, prices rising, new outlets opening up . . . what more can an industry want? Assurance of sustained profits, say some, as they note that the advance in yarn prices was not adequate to cover simultaneous advances in labor and raw material.

However, it is safe to say that by and large this year will close as one of rayon's prosperous periods.

And—to repeat—it is probably only the beginning.

Rayon Expansion . . .

Industry's 1937-1939 Capacity

Prospects are Analyzed

ONE of the major needs of rayon's consuming markets at the moment is a clearer understanding of the status and prospects of the yarn industry's capacity expansion program. The state of that program has changed frequently in late months, resulting in the circulation of various rumors, most of which are manifestly without foundation. While it is obvious that the picture includes many unpredictable factors, a degree of clarification is possible and necessary. The following analysis therefore is offered by TEXTILE WORLD with the thought that it may aid the consuming industries to plan ahead intelligently with respect to yarn delivery prospects.

Foremost is the fact that there has been a delay of about 12 months in completion of the general expansion program, which means that it will not be fully consummated before the end of 1938 or early 1939. This delay is due to two causes: (a) delayed shipments of new equipment; and (b) difficulty in getting the proper types of skilled labor. Incidentally it may be added that the rayon pulp shortage is now practically at its peak and probably should become progressively less acute hereafter, as expansions now projected in the pulp manufacturing field may be expected to equal the rayon industry's increasing requirements.

In appraising the current situation, three points should be kept in mind: (a) Subsequent developments are more apt to retard than to accelerate completion of the program; (b) Figures under discussion are *capacity:* actual production, of course, would be somewhat less; (c) Figures cover filament rayon yarn only, staple fiber not being included.

Status and Prospects of the Expansion Program: An official study made by *Rayon Organon* in December, 1936, showed that productive capacity in the rayon yarn industry in November, 1936, was 325,000000 lb. annually based on 150 denier, and that the industry's expansion program, if completed on schedule, would raise the total capacity to slightly over 400,000,000 lb. by early 1938. The unavoidable delays already referred to compelled readjustments of these calculations and the *Organon* stated in April, 1937, that the 1938 capacity figure must be revised "substantially downward, perhaps to 360,000,000 lb. or less, while the 400,000,000 lb. figure will not be realized until the end of 1938 or early 1939."

A reasonable, though, of course, conjectural picture of the prospects is afforded by studying current production statistics. The *Organon* states that production for the second quarter of 1937 totaled 78,450,000 lb. By projecting that total to an annual basis (with adjustments for closed plants, etc. and distinguishing between theoretical and operating capacity), we get an annual capacity rate of about 340,000,000 lb. for the current year. Starting with a November 1936 capacity figure of 325,000,000; assuming that it has reached the above 340,000,000 rate by mid-1937; and that it will continue to increase at this straight line rate, then we might expect a capacity rate of 360,000,000 by the end of 1937, a capacity rate of 380,000,000 by mid-1938 and a capacity rate of 400,000,000 by the end of 1938 or early in 1939. This is based on a 15,000,000 capacity increase in the first half of 1937 and a 20,000,000 capacity increase in each of the three subsequent half-year periods, concluding at the end of 1938.

Where Staple Stands

With some insight into present practices employed in spinning, slashing, fabricating, finishing and merchandising

WE all remember the story of Cinderella, the stepdaughter, who, starting as a household drudge, became a prince's wife to the chagrin of her ostentatious stepsisters. In many ways rayon staple—the stepchild of the synthetic yarn industry—reminds one of Cinderella. . . . But this is no fairy story. Rather it is matter-of-fact discussion of where rayon staple stands today, with just a glimpse into its probable future.

Look at the statistics—47,000,000 lb. of rayon staple being spun in the United States this year, as against 25,000,000 last year, and under 7,000,000 the year before. Similar chemically to filament rayon, staple possesses some important physical properties—softness, good draping quality, uniformity, and a pleasing luster (the reasons for which we carefully outlined in our Rayon Year Book Number for September, 1935, pages 107 and 108). The least desirable characteristic of rayon staple, its low resistance to creasing, can be greatly improved by suitable chemical treatment.

The manufacture of spun-rayon yarn has not settled down to an exact science. Most of it today, about 65%, is being spun on the cotton system. This includes not only the more common 1½-denier staple, but also, in increasing quantities, the 3- and 5½-denier to imitate wool. Some 25% of the staple is spun on the worsted system, and the amount is growing fast. The remaining 10% is handled on the woolen system, which still employs far more waste than cut staple, and on the spun-silk system. Eventually, of course, all the operations between the raw fiber and the spinning frame may be eliminated on some such basis as the Perlok principle (TEXTILE WORLD, December, 1936, pages 68 to 70). The fiber itself will be further improved. The following articles show how the science stands at present:

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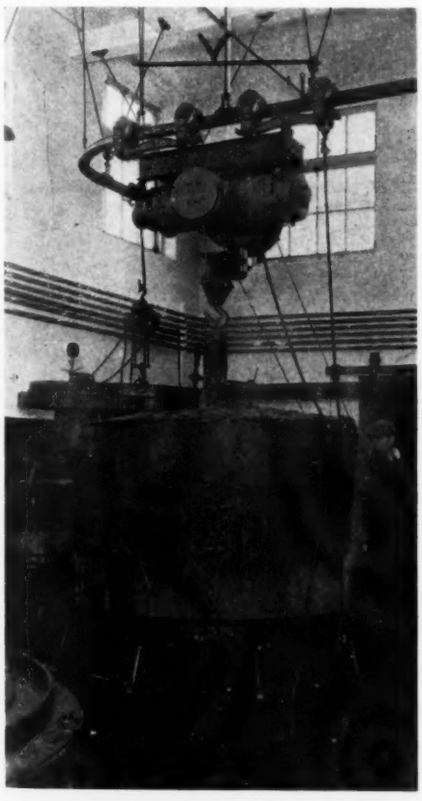


Cotton and wool raw-stock dyers face new problems in staple rayon

Staple Stock Dyeing

BY H. O. KENNETTE

E. I. du Pont de Nemours & Co.

IN general, the raw-stock dyeing of rayon staple follows the same principles employed in the raw-stock dyeing of cotton or wool; therefore, the problem is relatively simple if one will recognize a few of the fundamental mechanics of raw-stock dyeing, and a few of the special physical properties of rayon staple. Rayon staple wets out with water or dye liquor many times faster than cotton. When rayon staple is wet out, it swells and thus requires more space. When this swelling takes place in a confined space, the staple greatly resists the flow of liquor through it. The finer the denier, the more dense is the mass, and the greater is the problem of penetration.

The most common type of raw-stock dyeing machine in use today in the cotton industry is that type of machine which circulates the dye liquor through the raw stock which is in the form of a huge fiber cake. Rayon staple 1.5-denier or coarser, cut to 1½ in., can be satisfactorily raw-stock dyed in 500- to 800-lb. lots in a 1000-lb. machine.

Uniform Penetration

Successful raw-stock dyeing of rayon staple depends on the proper loading of the machine so that the dye liquor can uniformly penetrate the whole mass. A cake that is too dense over all or in spots, as a result of improper loading, does not permit uniform dye application or a rapid exchange of the dye liquor uniformly throughout the cake. This results in pressure spots, channeling, and a tendency for the dye liquor to become exhausted before reaching all parts of the cake. The net result is non-uniformly dyed fibers. In many instances it will be noted that the top or bottom of the cake has been excessively dyed, while the remainder of the cake has been insufficiently dyed.

whether the top or bottom of the cake is dyed first naturally depends on the direction of the flow of the dye liquor.

The rayon staple must be thoroughly opened, fluffed up, and uniformly loaded into the dyeing machine. The machine should be loaded in such a way that the density of the cake is sufficient to prevent pressure spots, channeling, and at the same time permit a free flow of the dye liquor uniformly through the cake when the circulating system is started.

Some rayon dyers like to apply the dye liquor to a wet staple, while others prefer applying it to a dry staple. In either case, the initial wetting-out of the mass is important. This should be done by gravity from top to bottom of the cake by overflowing the dye-mixing compartment without starting the circulating pump, and allowing the staple to wet out gradually. When the staple cake is wet out in this manner, pressure spots are reduced to a minimum.

The following method has been used successfully in raw-stock dyeing of rayon staple with direct, sulphur, and vat colors applied directly to the dry staple. When vat colors are applied by this method, they are usually in the unreduced form and are reduced on the fiber and subsequently oxidized.

The dye, regardless of type, is mixed and put in solution in a large drum, 50 gal. or more, depending on the load of the machine. The dye liquor is then run into the mixing compartment and the water turned on without the circulating pump being started. This allows the water and dye to overflow and wet out the batch by gravity from top to bottom. When the entire mass has been wet out and the machine is full of dye liquor, the circulating pump is put into operation and the normal dyeing procedure carried out. Proper selection of the dyestuff is naturally of vital importance to the successful rawstock dyeing of rayon staple. Information on the working properties, temperatures, and time cycles of the dyes selected can be obtained from the manufacturers.

Finish Necessary

During the dyeing operation the finish put on by the rayon manufacturer is removed, and a new finish must be applied. Rayon staple without finish is very difficult, if not impossible, to handle successfully because of the development of static electricity and the necessity for some lubrication during picking, carding, and spinning. The finish must be a good de-electrifier, it must supply sufficient lubrication and pliability for easy opening and drafting of the fibers, and at the same time it must have sufficient cohesive properties to produce good lap formation and web strength. The finish requirements vary according to local conditions, such as type of dyes used, time of storage of the dyed staple and yarn, relative humidity in the mill, and denier per filament of the rayon staple used.

The ingredients for the finish are added to the last rinse, or to the last part of the dyeing if no rinse is made. The solution containing the finish is then circulated through the mass for 10 to 20 min. at 130° F. or more to insure thorough penetration and uniform application.

The staple is then given a normal extraction down to 100% moisture, calculated on the dry basis. The staple is then dried. Rayon staple does not give off its moisture in the dryer as rapidly as cotton; therefore it is necessary to reduce the speed of the dryer. The staple should come from the dryer free from wet spots and containing a uniform moisture content. Drying temperatures should be of the same order as used in drying continuous-filament rayon.

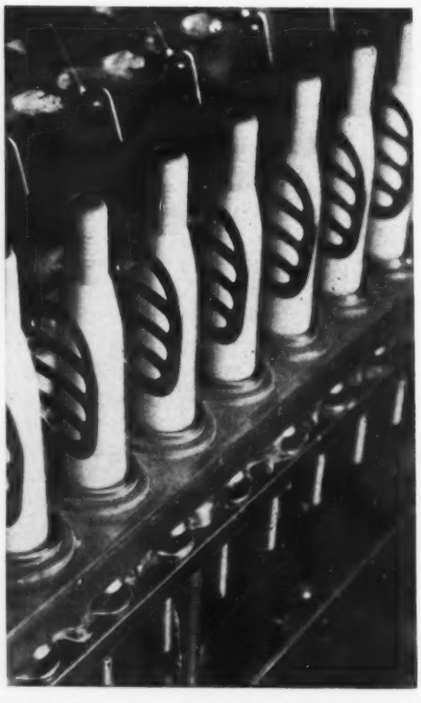
Before processing the dyed staple in the opening, carding, and spinning operations, the staple should be opened up and allowed to condition to uniform moisture content in a humidified area at 55 to 65% relative humidity for 12 to 24 hr.

Staple on Cotton Machines

MOST rayon staple is 1½-in., 1½-denier and is spun on the cotton system. Literature on this fiber size and method, although sparse enough, is more plentiful than on other sizes and methods. The best article on the subject which has appeared to date, in the opinion of the editors, is the paper by H. O. Kennette, of E. I. du Pont de Nemours & Co., which was printed in the May, 1937, issue of TEXTILE WORLD. For the convenience of readers, data from this article are presented here again, this time in tabular form.

Table I—1½-denier, 1½-in. staple

Picking
Blade beaters ..... 1,000 r.p.m.
Carding beaters ..... 800 r.p.m.
Fan speeds, slightly in excess of beater speeds
Hopper feed, slower than cotton due to density of staple rayon



The spinning frame will take staple with very little readjustment

Finished lap weight..... 12 to 14 oz.
Staple can be prepared by conventional cotton pickers or by one-process pickers, without major changes.

Carding
Doffer speed ..... 6 to 9 r.p.m.
Cylinder speed ..... 165 r.p.m.
Lickerin speed..... 360 to 425 r.p.m.
Doffer to cylinder..... .007
Lickerin to cylinder..... .007
Flats to cylinder ..... .010 (all around)
Feed plate to lickerin..... .012
Top flats ..... 1 in. per min.
Card clothing..... up to 120 or 130, or straight wire or metallic
Normal card settings for good grade of cotton are satisfactory for staple. Sagging web can usually be corrected by adjusting comb and maintaining proper relative-humidity conditions; or calender-roll speeds can be increased if necessary. Unnecessary in most instances to replace mote knives with steel under-casing.

Drawing
First to second roll..... 1⅞ in.
Second to third roll..... 2 in.
Third to fourth roll..... 2⅛ in.
Top-roll covering..... leather or metallic
Speed, draft, and production..... comparable to long-staple cotton

Roving
Slubber
Twist factor..... .70 to .75 times square root of hank roving produced
Front to second roll..... 1⅜ in.
Second to third roll..... 2 in.
Spindle speed ..... 450 to 650 r.p.m.

Intermediate
Twist factor..... .75 to .80 times square root of hank roving produced.
First to second roll..... 1⅜ in.
Second to third roll..... 2 in.
Spindle speed ..... 650 to 950 r.p.m.

Fine frame
Twist factor..... .80 to .90 times square root of hank roving produced.
Front to second roll..... 1⅞ in.
Second to third roll..... 1⅜ in.
Spindle speed..... 950 to 1,250 r.p.m.
Staple does not require high twist, so normal fly-frame speed is reduced 25 to 30 per cent to give same front-roller speed as used on cotton. Drafts normal to long-staple cotton are satisfactory.

Spinning
Twist factor..... 2.75 to 3.25 for maximum strength, higher where fabric properties demand.
Draft, speed and production..... Normal to long-staple cotton. Conventional system is used on medium and fine yarns; long draft has been successful on coarse counts.
Top-roll covering—Cork on crepe, coarse, and medium yarns; leather on fine counts.

Humidity in Carding and Spinning
For viscose, 55%; for acetate, 65%.

For the information of those persons interested in four-process roving, we are again presenting the table which appeared some time ago in Victor Ring

Traveler Co.'s house organ, *The Traveler:*

Table II—Layout for rayon staple 1½-denier, 1½-inch

Breaker Picker
2–40" porcupine beaters.....480 r.p.m.
Lap weight .....14 oz. per yard
Relative humidity.....60–65%
Cleaning bars on pickers covered over. Grid bars uncovered.

Finisher Picker
1–18" Kirschner beater.....650 r.p.m.
Lap weight.....12 oz. per yard

Card
R.p.m. doffer.....6.5
R.p.m. lickerin.....320
Card sliver.....40 grains per yard
Production.....240 lb. per 40 hr.
Relative humidity 60%
Top-flat speed on cards,
1¼ per min. past a given point
Feed plate on cards set as close as possible—
.010" on long-nosed plate
.015" on short-nosed plate
Mote knives set..... .022" from lickerin
Mote knives set..... .029" from lickerin
Percentage plate on cards set as close as possible; or in other words, set close enough to get a strip all the way across the plate.

First Drawing
R.p.m. front roll..... 300
Sliver.....53 grains per yard

Second Drawing
R.p.m. front roll..... 300
Sliver.....60 grains per yard

Slubber
Draft.....60-hank from 60-grain sliver
R.p.m. spindle 550
Twist per inch.....55

Intermediate
Draft.....1.50-hank from .60-hank dble.
R.p.m. spindle 625
Twist per inch..... 926
Relative humidity 50%-55%
(This is for 9 x 4½" frame)

Fine frame
Draft.....3.00-hank from 1.50-hank dble.

More and more rayon is being spun on the worsted system

R.p.m. spindle 750
Twist per inch..... 1.50
(This is for 7 x 3½" frame)

Jack frame
Draft.....7.00-hank from 3.00-hank dble.
R.p.m. spindle 1025
Twist per inch.....2.07
(This is for 6 x 3" frame)

Staple on Worsted Machines

By H. Wickliffe Rose
American Viscose Corp.

THE use of rayon staple in worsted blends has become so general that most of the larger suiting mills have fabrics of this type somewhere in their lines. The high price of wool during the last two years quite naturally has acted as an incentive to find some way of maintaining the price of clothes, particularly in the lower brackets. Rayon fiber was not new to the woolen industry, for rayon waste from the manufacture of yarn had been used for many years in wool blends. The new interest in rayon fiber for worsted, however, brought about the creation of rayon staple for that particular purpose; and many developments have followed, both in the rayon-manufacturing plant and in the worsted mill.

After having introduced rayon staple into worsted blends because of its low price compared with wool, the worsted manufacturer was surprised to find that he was dealing with a stronger fiber than wool. An all-wool yarn, worsted spun, has about 40% of the strength of rayon-staple yarn spun on the same system. A blend of the two becomes stronger as the rayon content is increased. Wet rayon has not yet reached the point where it has the strength of wet wool, but for all practical purposes of fulling and finishing in the mill, the rayon blends give no difficulty wet or dry.

Constant Improvement

The worsted manufacturer, in using rayon staple, is dealing with a fiber which is so much stronger than wool that he is likely to overlook the differences in wearing quality between fabrics made from different rayon staples. Constant improvement is being made by the rayon manufacturers; and toward the end of this year staple will be available with considerably more strength, both wet and dry, than the present regular production. By the time the price of wool is lowered, the wearing quality of rayon fiber will have helped establish a place for itself which will be maintained.

Worsted-suiting blends run about 50% rayon staple at the present time. Some fabrics contain less and a few even more, but the half-and-half proportion seems to afford a good balance between technical points and cost factors. Preparation and blending are done in various ways. Stock, top, and piece dyeing are all used. Wool and rayon staple are sometimes blended before combing, sometimes after; but usually in gilling tops of the two. Fabrics may have a construction of different yarns, some all-worsted, some all-rayon, and, in some cases, cotton or silk. The plaids are constructed to give contrasting effects. The main volume, however, is in fiber blends; and in these the most active branch is men's suitings. Women's wear is an important part, but not a large factor, as with spun rayons which are made on the cotton system.

The rayon stable used in worsted blends for suiting is almost entirely viscose type. Price is quite a factor and, as the acetate type is higher, so far there has not been the incentive to use it in suitings. It is used for specific, purposes, such as cross-dyeing between yarns, or heather mixtures in a yarn; but the volume there is relatively small. As time goes on and developments continue, particularly as to increased production and lower price of acetate staple, its use in worsted suitings may increase considerably. It has qualities that are of interest to a worsted man. Segregation in the mill should be worked out satisfactorily, and the necessity for segregation will diminish as the tendency of the acetate to fly is overcome by treatment or by method of handling and put-up. A worsted mill keeps lots separate as a matter of routine—more so than a cotton mill—and without the complication of fly the use of acetate should give no great concern.

Acetate in Pile Fabrics

The volume of acetate staple in worsted mixtures today is used for pile fabrics. The automobile-upholstery mills use blends up to 40% acetate staple in worsteds for plush, for the acetate seems to have characteristics that make it suitable for the particular requirements of this field. Its water-resistant quality, its bulk, crimp, and resilience make it interesting for the plush manufacturer. Even one of the difficulties with acetate, its accumulation of static electricity, is thought by some to act as an aid in making a good plush by keeping the fibers from matting. The various factors favorable to acetate have to be weighed against the cost of the fiber and the difficulty of dyeing it. Efforts are being made to offset cost by getting continuous filament into top or roving

without going through the usual carding and combing processes.

In plush and in carpets progress is being made with rayon blends. Heavier deniers of rayon staple are produced to blend with the mohair and wool in such materials. In plush or carpet the resilience of a fiber is the important characteristic. With this factor in mind, developments are being worked out by the rayon manufacturer, the fabric mills, and by scientists allied with the industry. Progress made along this line during the last year gives only a hint of what might be accomplished in the future.

Rayon staple in worsteds offers versatility, and in that is one of its major assets. The fact that it can be controlled in its production as to fineness of fiber, length of staple, stretch and shrinkage, crimp and smoothness, luster, dye affinity, and specific gravity or bulk, is of the greatest interest to a worsted manufacturer. He has been dealing for generations with a fiber where variations enter in to complicate its nature from the time the fleece starts growing on the sheep's back until it is sorted and graded, and all the machinery and technique of a worsted mill are designed and set up to handle a variable fiber. Rayon staple fiber, on the contrary, is manufactured uniformly to contain the combination of characteristics required for a particular fabric; and, if it is turned out by a producer of known reliability and experience, it will run uniformly, not only throughout an entire lot but from month to month.

Uniformity

A dyer uses one formula and procedure for one type of rayon fiber on each successive lot and has less difficulty with matching shades and with level dyeing than with wool. In that fact lies the advantage of a mill establishing a run on one make, rather than in shopping around and switching from one type to another. The mills are going through the experimental period in which they are finding out what rayon fiber will do and what types are best for particular needs, and as this information is gained they are gradually settling down to production runs.

There are as many different rayon staples as there are manufacturers; and, as is the case with continuous-filament rayon yarns, the different manufacturers produce fibers that are similar but not identical.

These fiber differences are being weighed at the present time against price, and frequently a mill decides to buy price instead of character. Competitive factors of supply and demand, of increased domestic production, of lower costs on a volume basis, will tend to narrow the differential in price between domestic and foreign rayon staples. As this takes place, the technical qualities will have increasing importance in the mind of the worsted manufacturer, and he will take full advantage of the continuity, uniformity, and versatility of the American supply.

Sizing Spun-Rayon Warps

By Irving J. Saxl

Consulting Physicist and Chemist, Providence, R. I.

In establishing special slashing procedures for spun-rayon warps, we first have to consider the reasons why any warp should fail in the loom. The main factors which influence the weavability of a warp are: (1) breaking strength of the individual yarns; (2) coefficient of friction of the yarn versus metal; and (3) hairiness of the yarn. While there are other factors which should be taken care of, in this article the author will limit his discussion to those three major points and will indicate warp sizing treatments which are in accordance with the fundamental principles involved.

★ ★

1. *Is the spun-rayon warp handicapped by lack of tensile strength?*

A look at Fig. 1 will answer this question. The diagram, which has been determined under conditions of extreme precision and reliability with the load elongation tester developed by the writer, indicates a load-extension curve of an unsized spun-rayon yarn, single 22s, and shows clearly that the yarn has a tensile strength in excess of 200 grams with about 7% elongation. Note also that in this unsized yarn the yield point is missing.

The author has shown previously (*Textile Research*, Vol. 5, No. 12, pp. 519-37) that one reason for sizing warps is to protect them against yielding at too low a load. The very fact that we do not have to contend with this problem here gives us an important indication toward the sizing formula. Obviously if we do not have to shift the yield point, then it is unnecessary to deposit heavy gelatin films upon the yarn to protect it against excessive elongation.

2. *Is the coefficient of friction low enough?*

In a paper by the author, "The Quantitative Determination of Friction in Individual Yarns," published in the *Journal of the Franklin Institute*, June, 1936; it was shown that of the various yarns in practical use spun rayon has the lowest coefficient of friction by a safe margin.

It is safe to state, therefore, that the amount of lubrication which has to be added to the surface structure of the yarn may be kept to a minimum.

3. *Does hairiness of the yarn interfere with weaving?*

This is a question that has to be determined in accordance with the standard practice of spinning, warping, and weaving. While a high twist will bind the hairs that extrude from the yarns, a low twist will make the yarn substantially hairier and require a different treatment. Accordingly, the number of turns and the original hairiness of the yarn determine to a large extent the sizing formula.

High-twist yarns, such as are used in spun-rayon crepe, hardly require any sizing. In fact, the writer has seen spun-rayon crepe, woven on single-

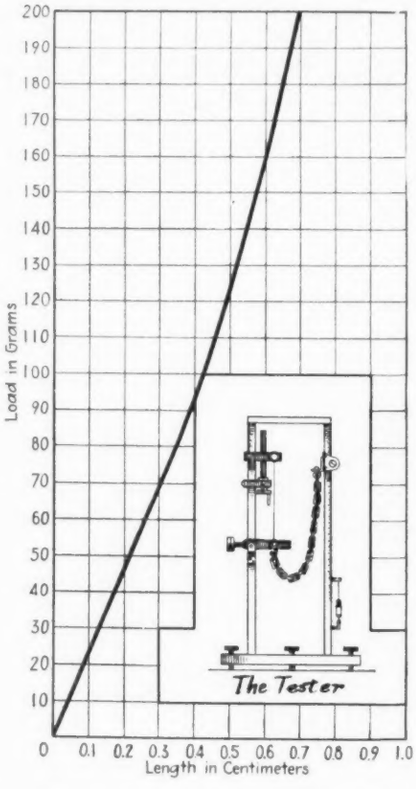


Fig. 1. Dynamic characteristics of unsized spun rayon as determined with the Saxl precision load elongation tester

TABLE I. Formulas for sizing spun rayon yarn

150 Denier; 40 Filaments
4 lb. good technical gelatin
1 lb. sulphonated coconut oil—or ½ lb. olive oil soap and ½ lb. glycerine.

100 Denier
6 lb. gelatin
1½ lb. sulphonated coconut oil—or ¾ lb. olive oil soap and ¾ lb. glycerine.

150 Denier; 60 Filaments
5 lbs. gelatin
1 lb. sulphonated coconut oil—or ½ lb. olive oil soap and ½ lb. glycerine

In each formula the ingredients are dissolved in 24 gal. of soft water, and run in the size box at 110° F. Water can be softened by adding 1 lb. of borax.

TABLE II. Temperatures and speeds in sizing spun rayon

Temperatures, Fahrenheit

Size Pan	1st Can	2nd Can	3rd Can	4th Can	5th Can	6th Can	7th Can
160°	180°	180°	180°	180°	180°	180°	160°

Speeds, depending on denier

	yd. per min.
2000 ends in warp	60
3000 ends in warp	50
4000 ends in warp	40 to 45
6000 ends in warp	35 to 40
7000 to 8000 ends in warp	30 to 35
8000 to 10,000 ends in warp	25 to 30

double-, and triple-beam jobs, weaving perfectly without sizing.

On the other hand in the case of lower-twist yarns, such as those imitating wool, a substantial amount of hairs stick out from the yarn, and a reasonable amount of size should be used to bring them through the loom without shedding the lint.

★ ★

From what has been said, we can see clearly that sizing of spun-rayon warps is necessary primarily as a filament and hair binder, and not for the purpose of strengthening or lubricating. Therefore methods must be used that will produce the smoothest possible warp.

Spun-rayon warps can be run on either the silk- or cotton-system machines equally successfully. It is good practice, however, to use the silk system for warps of heavier construction, while lighter warps are run preferably on the cotton system.

In view of the nature of spun-rayon yarns, with the usual type of rayon warp-sizing equipment, it is advisable not to use anything less than a five-cylinder machine. Results, as regards smoothness of the yarn and its general quality, are substantially better with a seven-cylinder machine; in addition, production is about 50% greater than when using the five-cylinder machine.

While the exact formula in every instance depends upon the warp and cloth construction and the specific conditions of spinning, warping, slashing and weaving rooms of the individual mill, the formulas given in Table I are some that have been found most valuable under standard-practice operations. Approximate temperatures and speeds when sizing on a seven-cylinder machine are given in Table II. Finally, it should be emphasized that the problem of sizing spun rayon is one that has to be solved, not by rule-of-thumb methods, but by a straight engineering approach.

Spun-Rayon Fabrics

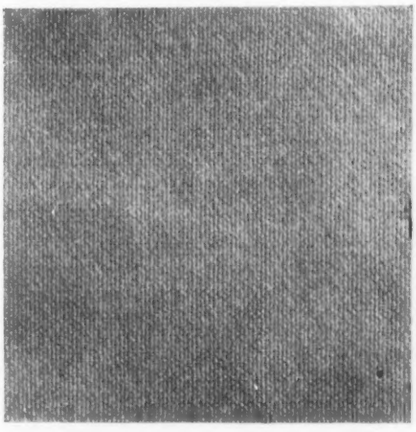
By Kenneth N. Merrill
William Whitman Co., Inc.

SPUN rayon has made its greatest advancement in the so-called rayon-weaving trade. It is here to stay by virtue of the fact that it has found its way into staple fabrics which have been tested and approved by the consumer. Many of these fabrics have continued in favor for several seasons, and each successive season has shown large increases in the yardages consumed. Their continued success has arisen out of their own merits, and they are not looked upon by the manufacturer or the consumer merely as imitations of fabrics made from natural fibers.

Linen Effect an Early Success

Many in the textile industry who at present are not in close contact with this development do not realize the great variety of spun-rayon fabrics which have already proved successful from the viewpoint of both manufacturer and consumer. The linen effect in plain weave made from 100% spun rayon was among the early successes. This effect has retained its style acceptance for several seasons and has been used as a basis for creating many high-styled novelty weaves. Included in this family are washable shantung-effects, which are also rapidly becoming staple numbers. Spun-rayon challis is another important development and is undoubtedly one of the most basic of all spun-rayon fabrics. It is used in plain weaves for solid colors and prints and is employed as a ground construction for many woven patterns and designs. This fabric has found favor not only for dresses, for which it was originally created, but it has also been used extensively for mufflers, neckwear, robes, and many other articles of apparel. Another development in the field of staple fabrics is spun-rayon broadcloth. This shows promise of having unusual possibilities for shirting, but its adoption is sure to extend into many other channels.

Spun-rayon summer suitings have had a particularly wide acceptance during the last few years. Several nationally advertised lines of both men's and women's summer clothing and sportswear have featured these fabrics exclusively. A great variety of yarns and weaves have been employed in this group. Equally successful fabrics have been produced from 100% spun rayon combined by means of blending or twisting with silk, worsted, mohair, and continuous-filament viscose and acetate yarns. The dry-cleaning and laundering requirements have been adequately fulfilled. A few of these fabrics have been adapted for neckwear purposes and are being distributed with considerable success under the same trademarks as the clothing.



Congo Cloth, woven of patented yarn (courtesy of Brand & Oppenheimer)

Simulating Woolen and Worsted

The fabrics enumerated thus far have been selected at random to illustrate the trend of developments in cloths constructed principally of all-rayon. An entirely separate classification is the fabrics simulating woolen and worsted effects, with their infinite range of texture, pattern, color, and hand. Every virtue of spun rayon is utilized to its utmost advantage in this extensive field, and it is impossible to estimate fully the vast potentialities which lie before it. The fabrics produced thus far have ranged from very sheer dress materials to heavy suiting weights. Gabardines, homespuns, tweeds, and hopsaking are but a few of the fabrics made of spun-rayon blends which were included in many of the high-style lines last spring and are gaining more extensive recognition during the current fall season.

Among the miscellaneous woven fabrics in which spun rayon has been employed with considerable success are plushes, velvets, upholstery and drapery

fabrics, wide and narrow elastic webbings, ribbons, laces, towels, and countless other materials for apparel and household articles.

Spun rayon and worsted blends spun on worsted machinery, both Bradford and French systems, are constantly commanding more active interest and attention on the part of weavers of men's-wear and women's-wear fabrics. An outstanding and essential development in this field has been the successful dyeing of the rayon staple in top form, similar to the maner employed in dyeing worsted fibers for mixture and heather color effects.

An important division of spun-staple yarns is that of spun acetate. The acetate-staple producers are laying great emphasis on the development and research being conducted to produce a fiber resembling as closely as possible the appearance, loftiness, and resiliency of woolen and worsted fibers. Spun acetate has been utilized to best advantage thus far in color effects in both cross-dye and two-tone fabrics. Still another use is found in fabrics where the acetate is required to imitate hair effects, such as rabbit hair. Very coarse acetate staples are demanded in this type of work. One-hundred per cent spun acetate will undoubtedly be used more extensively as the new and improved staples are perfected.

Knitted Fabrics

Although the knitting trade opens a wide field for spun rayon, its many ramifications have caused results to be realized slowly. There is absolutely no doubt, however, that spun rayon will eventually be used in practically all fields of knitting. To date the most important advance made in any single division of the knitting trade has been accomplished on the tricot type of warp-knitting machine. The many-season vogue for bengaline-type knitted gloves resulted from the development by Julius Kayser & Co. of "Wool-Bar," a tricot-knitted spun-rayon and worsted blend.

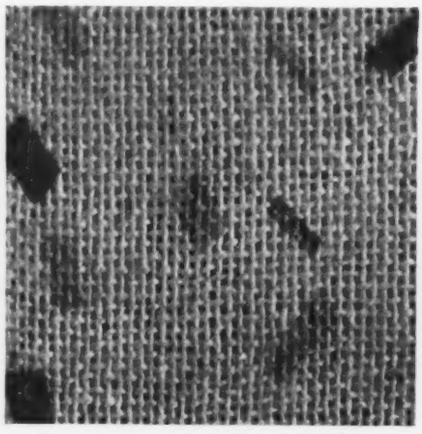
The hosiery trade, particularly the men's half-hose division, has made substantial gains in the consumption of spun rayon, especially in the use of blends to simulate all-worsted hose. Spun rayon and acetate are featured in the popular-priced lines, the acetate being used primarily for color work. Wide experimentation has been going on in the circular-knit underwear industry, but it was not until recently that this field produced satisfactory results. Commercial knitters, as well as knitters styling their own lines, are beginning to market, with reasonably good results, fabrics made with 100% spun rayon in both plain balbriggan and novelty effects. Its laundering qualities have been most satisfactory, and it is felt that with the greater advancement made in the staple itself as to tensile strength, elasticity, etc., this division will be another large consumer of spun-rayon yarns.

Development Procedure

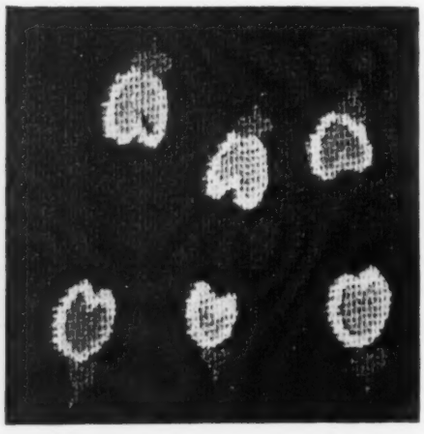
It is no longer difficult to interest fabricators and merchandisers of most textile products in experimenting with spun rayon, but in too many cases the prospective user is reticent and even secretive about the requirements, ideals, and consumer-usages of the product which he is striving to manufacture and market. The result of this attitude is to hinder greatly the sources which are best qualified to render assistance. The staple producers and the spinners, being fewer in number, have naturally found it easier to exchange information on the basis of mutual confidence. This has resulted in substantial advancement being made in the manufacturing problems confronting these groups.

In order to be of practical assistance, it is esential for the supplier to have a great deal of information, some of which might seem elementary. Details, such as texture, hand, color effect, tensile strength, and other technical requirements, and even the equipment on which the yarn is to be woven or knitted, are matters of utmost importance which are too often left to speculation on the part of the supplier. Careful thought must be given not only to the deniers, lengths, and degrees of luster of the rayon and acetate staples and to the fibers used as complementary ingredients (such as cotton, woolen, worsted, alpaca, rabbit hair, mohair, linen, and ramie), but also to the actual yarn construction, particularly the directions of twist and the number of turns of twist, both of which have an all-important effect upon the texture, pattern, and hand of finished product.

Weavers and knitters are finding that they may deal with reliable spinners and staple producers with complete confidence that their "new idea" will not be disclosed to their competitors.



Hopsaking, woven of yarn containing a novelty blend of rayon and worsted (courtesy Du Pont Fabric Development)



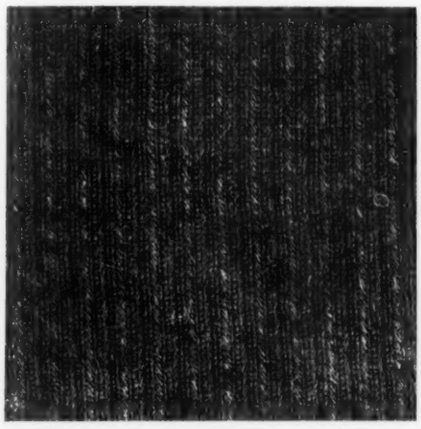
Homespun, woven of rayon-worsted-blend yarn (courtesy of Du Pont Fabric Development)

Spun-Rayon Finishing

DURING the last year or two notable progress has been made in dyeing and finishing rayon staple. Most of the improvement, however, has been in the modification of methods previously employed for other types of textiles, rather than in the development of entirely new methods or equipment. Properties of rayon staple which make it necessary for the dyer and finisher to observe special precautions in handling it include its tendency to swell in diameter and become weak when wet, to become hairy during processing, and to develop creases during or after finishing.

The largest percentage of rayon staple is spun on the cotton system, woven on cotton or silk looms, and dyed in the piece. The usual preliminary treatment consists of impregnation at full width with dilute caustic soda, followed by a thorough scouring and rinsing in rope form. As a rule, these operations are carried out on a continuous machine—either a modified silk-weighting machine or one of the newer types of equipment developed for handling rayon. In some plants padders are employed for the caustic impregnation, after which the goods are scoured in a reel machine or on a jig. Frequently these processes are preceded by singeing, and—if starch or dextrin has been used for warp sizing—by treatment with a desizing agent.

After scouring and drying, the goods are dyed on a reel machine, jig, or padder, depending on the depth of shade and construction of the fabric. For plain shades direct colors are used almost exclusively; grounds for discharge prints are ordinarily obtained with developed colors, although some direct dyes are used. Very little fast-color work is being done at present. There are no particular difficulties encountered in dyeing, provided the dyes are carefully selected and applied and



Wool-Bar, knitted of rayon-worsted-blend yarn on tricot machines (courtesy of Julius Kayser & Co.)

precautions are taken to avoid mechanical damage to the goods. Even those dyes which are not particularly level-dyeing can be employed, if care is taken in making additions of salt to exhaust the bath. Fairly heavy shades can be obtained by padding the goods with direct colors and then giving a couple of runs in salt solution on the jig. Cross-dyed effects are readily produced in the usual manner on fabrics which contain acetate staple in combination with other fibers.

Since finishing agents should be of a type which will not oxidize or go rancid, fatty alcohol sulphates and other of the newer finishing compounds are finding favor for use on rayon staple fabrics. One of the principal drawbacks to dress goods, summer suitings, and other apparel fabrics made from rayon staple is that they lack elasticity, and wrinkle and crease easily. Fortunately, by the time staple fiber had begun to be used in sizeable quantities in this country a method had been developed for impregnating rayon with synthetic resins in such a way as to render them resistant to creasing. This synthetic-resin treatment is now being employed extensively for imparting a wool-like, crease-resistant finish on rayon staple fabrics. The method followed was described in some detail in the April, 1937, TEXTILE WORLD.

Although comparatively little staple fiber is used in the manufacture of woolen fabrics, large amounts of cut rayon waste are blended with wool and spun on the woolen system. Usually the cut rayon is stock dyed before it is blended with the wool. For the most part sulphur colors are employed, but some ground shades are produced with direct colors after treated with formaldehyde. Stock dyeing is discussed in more detail in an article on page 89.

Finishing of rayon-woolen blends calls for considerable modification of the ordinary procedure for all-wool fabrics. Fulling, scouring, and extracting, however, are carried about as usual, care being taken to prevent mechanical damage to the fabric while wet and to employ a heavy-bodied fulling solution to felt the two fibers together. Many finishers are afraid to nap wet, but this danger can be avoided if the goods are rolled up and allowed to lie overnight before wet napping. After napping, the goods are given one run on a wet-cropping shear, if available. Otherwise they are dried and then dry sheared. The next step in most mills is to give a run on the steam brush, nap up, and then give a light pressing. Recently, however, a new method of dry finishing has been developed in which the goods are run on a combination steam brush and dewing machine, rolled three pieces to a roll, allowed to set overnight, and perched without pressing. This method, which was described in the August, 1937, issue of TEXTILE WORLD, imparts a superior appearance and feel which is not roughed up by severe handling of the goods. The combination machine can also be used for finishing rayon-woolen fabrics which are not napped.

Rayon-Worsted Blends

Increasingly large amounts of rayon staple are being combined with wool for the manufacture of worsted fabrics. In this case the staple can be top dyed with sulphur or developed colors, or vigoreaux printed, or the goods can be piece dyed. Top dyeing gives excellent results, the chief drawback being the high initial cost of the type of equipment necessary to do this work satisfactorily.

For vigoreaux printing the rayon is combined about 50-50 with wool and printed in the regular manner, usually with chrome colors or steam black. In the case of piece-dyeing, common practice is to dye with a combination of neutral-dyeing acid colors and developed colors, followed by diazotizing. Some men's-wear fabrics are dyed with a combination of chrome colors and developed colors, such as Black BH. Recently a special process has been evolved for dyeing rayon staple and wool fabrics in solid shades with solubilized vat dyes.

Many rayon-worsted blends contain as much as 50% of staple fiber. Finished in the usual way, they have a flat, pasty appearance and lack the hand of a good all-wool fabric. If the percentage of rayon exceeds 30%, blisters and cockles are likely to develop. To remove cockles Yorkshire crabbing in the grease is resorted to. After crabbing, the pieces are extracted, and fulled. Use of a rather heavy-bodied soap in fulling—6 to 10 oz. to a gallon, with only 1 oz. of alkali—helps the hand. The goods are transferred to the washer, cold water is added to work up a rich lather with the heavy fulling soap, the pieces are run for 30 min., rinsed for 90 min. in cold water, dried, and sheared. Pressing is likely to give the goods a flat, pasty appearance. Decating is better but on most rayon-worsted blends gives too flat a finish. It is better, therefore, to give the final finishing on the combination steam brush and dewing machine mentioned under woolen-worsted blends. This method imparts a rich worsted appearance and lofty hand.

Some rayon staple is being dyed in skein form and some in the form of various pile fabrics and knit goods. In those cases, again, the usual processes for filament rayon can be modified to give satisfactory results.

One of the most interesting things about staple fiber is the way in which its original properties can be changed by various chemical and mechanical treatments. At present interest is focused largely on changes which can be effected by means of synthetic resins,

Ewing Galloway

Methods and equipment used for dyeing continuous-filament rayon fabrics are being modified for rayon staple

and attempts are being made to develop compounds of that type which are easy to apply, which have no harmful effect either on the fibers or the dyes, and which give even more resiliency to the fabric than can now be obtained. During the next year the results of this research and other experiments now under way will be eagerly awaited by dyers and finishers of rayon staple.

Spun-Rayon Merchandising

THE story of staple-fiber this year is such a rapid-fire proposition that truly it should be written "on the run" so to speak. It scarcely stays long enough in one place to permit leisured analysis. During 1937 merchandising developments in this field followed each other with such speed that they practically outdated themselves as soon as they appeared.

With respect to broad policy two points are outstanding: First, as had been foreseen in our 1936 Rayon Issue —back in the dim past of twelve months ago—rayon's younger brother now is profiting by rayon's own experiences, and steps are being taken to avoid repetition of rayon's earlier mistakes. Second, the industry now recognizes that staple demands an individual merchandising program separate and distinct from that followed in continuous-filament rayon, and this principle now is being followed in the merchandising of spun-rayon materials.

Examining the picture more closely, interest immediately centers on the work being done to expand spun rayon's markets. The accomplishments in that respect have been of major significance. Thanks to its great asset of versatility, the new yarn is cutting a path for itself across the markets of virtually all major textiles. Particularly notable is the acceptance it is winning in such leading fields as women's dress goods, men's suitings, upholstery, and drapery. In men's all-year suitings, the worsted trade still talks of staple as an "adulterant" and inclines to restrict its use to popular-price fabrics, yet the significant fact remains that it is being consumed in ever-greater quantities for heavyweights and it seems to be definitely moving toward the all-year suitings which, of course, are the volume giant of the men's-wear field.

In Men's Wear Field

This fall both viscose and acetate staple are being used in heavy suitings. Topcoatings, made largely of spun rayon, are ready for the market and heavyweight winter coatings of substantial rayon staple content are being developed for commercial presentation. Then, too, staple is extending its markets in various other directions. One interesting point is that men's spun-rayon summerweight suitings are being increasingly used for shirtings, and have sold well in the latter field. Important progress also is being made in knit goods, notably in ties, socks, underwear, and outerwear.

Concurrent with this market expansion activity, the rayon merchandiser is increasing his educational effort with a view to facilitating retail and consumer acceptance of his customer's spun-rayons. The educational job includes distribution to retailers and also to certain key consumer organizations of magazines, booklets, and other literature, aiming to take the "mystery" out of spun-rayon in much the same way that earlier effort familiarized trade and consumer with the story of rayon itself. However, the two types of educational work are by no means identical; it has become increasingly clear this year, with the emphasis on fiber identification, that the task of building acceptance for spun-rayon presents individual and difficult problems. For instance, in men's wear, a special complication arises since there spun-rayon suitings lose their yarn identity and take the brand name of the clothier. To meet this problem, some rayon merchandisers are developing plans to build yarn acceptance among suit manufacturers. Unquestionably, the whole broad task of spun-rayon education will require persistent and prolonged effort. At present, it focuses mainly on the mill, but with growing attention to the three subsequent channels: (a) the clothier, (b) the store, with a gradual marshaling of forces for the ultimate promotion to (c) the consumer.

Courtesy Du Pont Style News Service

Increased consumption of spun rayon in men's summer suitings has been a notable feature of the new textile's developments this year. Illustration shows Congo Cloth which proved popular this summer in dark colors.

Stability of Price

With respect to staple-fiber prices and its market position generally, the most constructive side of the picture is the determination of the leading producers to hold steady on quotations and thus utilize rayon's big asset of stability. Staple fiber, like filament rayon, has faced an acute shortage problem. Certainly this has not dulled the zeal of those whose job it is to find new uses and new customers for the fiber, but it has presented the problem of meeting new demand after markets are created.

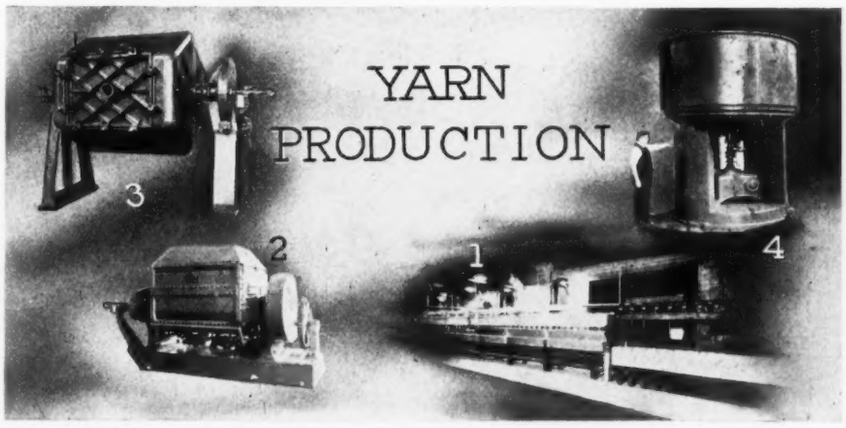
Turning from the present to the future, the question arises, what's ahead for rayon staple? Month by month this year staple has moved forward into division after division of the woolen and worsted field. Month by month, the new fiber has extended its already substantial gains in the women's wear field. Continued progress in these major directions might be taken for granted. However, the growth of staple has been so rapid and far-reaching it would be hazardous to say what markets we may or may not find it in before another year has passed. For the rayon merchandiser, the cue in such a situation is to keep the program more than usually flexible, with sufficient elasticity to permit overnight readjustments.

Three phases suggest themselves as likely to become increasingly important next year: (a) a further breakdown within the merchandising policy to meet certain particularized market requirements of staple, as for example the men's-suitings field which demands a totally different approach from women's wear, rayon's chief field for so many years; (b) the factor of fiber identification; contending that rayon originally suffered from a surfeit of brand names, merchandisers now incline to accept the term "spun rayon" for general promotion and to subordinate their own brand names; (c) with the thought that it may open new markets during the coming season, there is wide interest in the new strong staple fiber recently developed in Italy and fabrics of which will be available in the American market shortly. This fiber, it is claimed, has a higher strength than cotton, the ratings being: new staple 2.8, American cotton 2.4, and regular staple 1.9.

Machinery manufacturers continue their contributions to rayon's progress with

Better Equipment

A year ago in these pages was presented a complete record of the way in which American machinery manufacturers had contributed to the growth of the rayon industry during its first quarter century of existence in this country. The advances made in that period of time were shown by contrasting the earliest and latest models of various types of equipment brought out by individual companies specifically for use in the production and processing of rayon yarns and fabrics. During the last twelve months the machinery builders have not been content to rest on their laurels, but have persevered in their efforts to develop still better equipment for use in the rayon plant and textile mill. That they are succeeding in this endeavor is apparent from the following review of progress which has been made since last September.



YARN PRODUCTION—1. Automatic cake purifying machine (Smith Drum). 2 Duplex shredder. 3. Xanthating churn. 4. Vissolver (2 to 4, Baker Perkins)

INCREASED demand for both filament yarn and staple fiber has necessitated the installation of a considerable amount of new productive equipment. Much of this has been custom-built according to specifications of the yarn producers and its details have not been made public. On the other hand, several new types of equipment have been developed by the machinery manufacturers and made generally available to the trade.

One trend is toward the use of large-batch-size equipment in the preparation of viscose, and Baker Perkins Co., New York, is now offering three units of this type. These machines are a Duplex shredder capable of handling a charge of 500 to 600 lb. (dry weight) of cellulose in the same shredding time as the old standard 220 to 260-lb. shredder; a 900-gal. xanthating churn to accommodate a batch from the shredder; and a Vissolver built to handle from 15,000 to 22,000 lb. of viscose per batch, accommodating two charges of xanthate from the large churn. Introduction of these large-size units has naturally resulted in a decrease in capital investment per pound of viscose produced and also in a more uniform product.

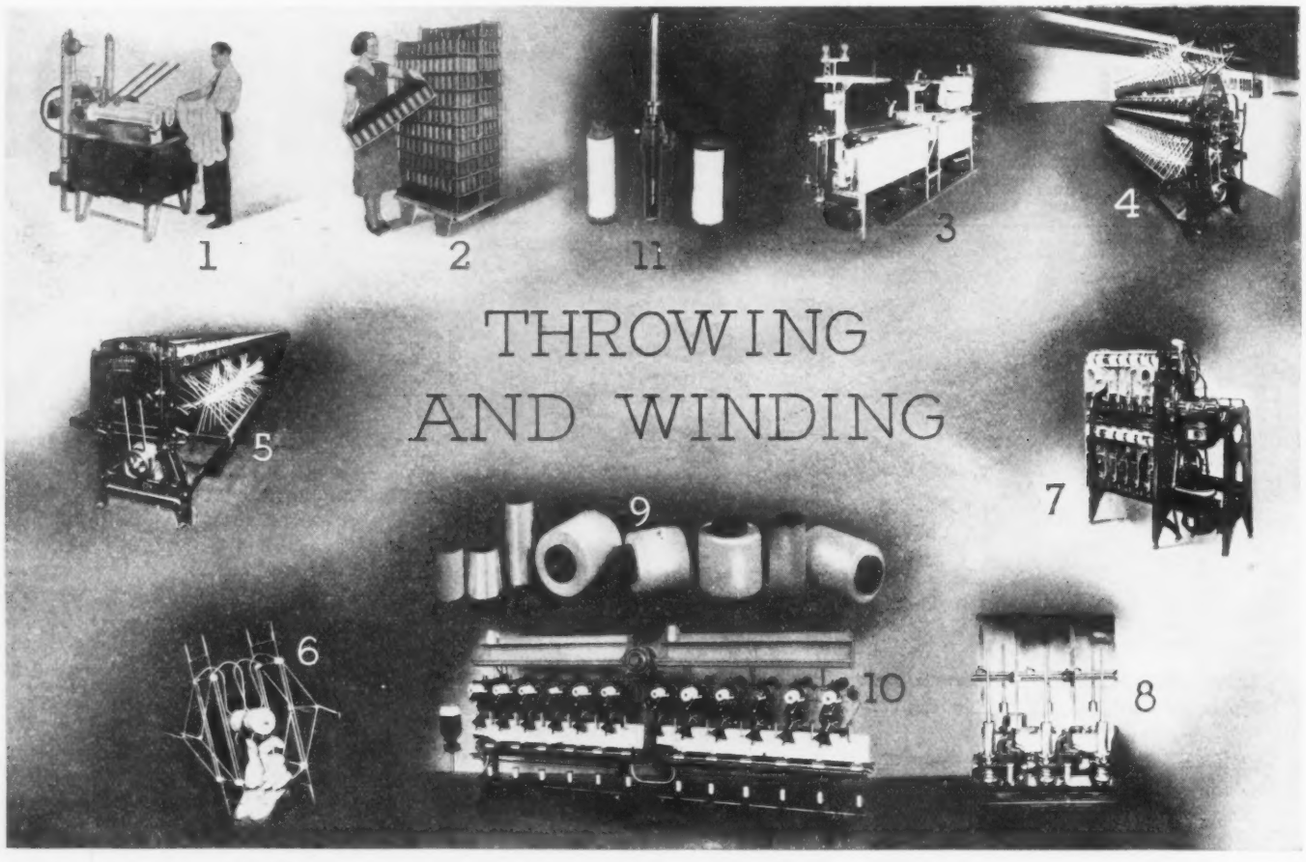
One of the recent developments in the xanthate dissolver manufactured by Turbo-Mixer Corp., New York, is the inclusion of the entire mixing element in a single integral unit at the bottom of the dissolver tank. The element is small and compact, and requires no draft tube. The centrifugal impeller design insures rapid and continuous recirculation of the entire tank contents and low power consumption. Because of this rapid circulation through the impeller, the xanthate crumbs are completely disintegrated and dissolved in a much shorter time than previously.

Another important feature of the dissolver is the drive head. This is an underdrive of sturdy construction, which takes the entire thrust and bearing load imposed upon the vertical mixer shaft. The shaft is solid from the impeller through the drive head, and no couplings are used. With this arrangement, no stresses other than the torsional transmission of power for which it is designed, are transmitted to the motor reducer. Still another feature is the open tilted impeller, which has many applications in both the viscose and acetate processes. Stagnation of material is impossible with this type of unit, as a high-velocity stream is directed into all parts of the tank. Major applications of this machine are in the blending and pigmenting of viscose, and in the neutralization, precipitation, and dissolving of cellulose acetate. Efficiency of the tilted impeller is said to be most strikingly shown in its ability to handle materials of very high viscosity, as in the dissolving of cellulose acetate spinning solutions. Horsepower requirements are low; dissolving time is greatly reduced: and it is possible to handle much larger batches.

Early in 1937, Smith, Drum & Co., Philadelphia, well-known manufacturers of bleaching, dyeing, and mercerizing equipment, entered the rayon field proper with the installation in one of the leading plants of a fully automatic machine for purifying rayon in cake form. With this machine, the time required for the complete purification and bleaching of viscose-type rayon cakes is 83 min., with a total water consumption of 30 gal. per pound of yarn. This is based on 1-lb. cakes of 150-denier, 40-filament yarn; for lighter-weight cakes or coarser filament cakes, the time is reduced to as low as 60 min. Chemical consumption is comparable to the older methods of purification, while water consumption and labor costs are appreciably lower. The principal consideration, however, is the fact that the filament quality remains the same as when taken from the spinning machine. This is evidenced in the coning of the yarn directly from cakes to cones—4-lb. cones of 150-denier yarn averaging slightly less than six knots per cone, or about 21,000 yd. per knot. The cakes are kept in their original condition, both as regards concentricity of package and filament condition. Operation of the machine—including the feeding of all solutions, their return to proper storage tanks, time of each individual treatment, temperature of solutions, feed and discharge of wash waters, bleaching, softening, and extracting—is entirely automatic. The operator loads the machine and engages one master switch by pressing a button. From this operation until the yarn is

completely purified, bleached, and softened, the various cycles are accurately controlled by a newly developed system of electrical timing mechanisms and electrically operated valves.

Although the machine operates on the centrifugal principle, the problem has been approached in entirely new manner. For example, the cakes when being washed, are totally submerged, thus giving an even pressure on the mass of cake. Also, the cakes are fully free to expand in the direction of their vertical axes. Due to the combination of these two conditions, channeling is impossible. Each cake is placed in a washing pot which is similar in appearance to a spinning pot. Each pot is driven by an individual motor. Also each pot has fixed orifices for intake and exhaust, and hence each cake gets identical treatment. As an example, should the machine be loaded in part with cakes spun for 4 hr. and the remainder of the machine loaded with 8-hr. cakes, each cake would be purified just as completely as the other, provided the electrical controls were set for the 8-hr. cake. Varying density of the cake is automatically provided for by the pot itself, and the electrical control mechanism is so flexible as to allow easy adjustment by the department supervisor to accommodate varying yarn types. The standard machine is built in self-contained units of 100 spindles. When operated in batteries of three or more with a staggered timing set-up, they require one operator per machine for maximum production. Smaller units of ten spindles are also available for research or experimental work.



THROWING AND WINDING—1. Three-arm soaking machine. 2. Self-stacking bobbin board (1 and 2, Johnson Engineering). 3. Double-unit skein soaking machine (J. V. Calhoun). 4. Double-deck winder. 5. Single-deck winder (4 and 5, Fletcher Works). 6. Adjustable swift (Atwood Crawford) 7. Drive end of twister. 8. Spindle-swing assembly (7 and 8, Atwood Machine). 9. Parallel packages produced on new twister (U. S. Textile Machine). 10. Improved No. 50 winder (Universal Winding). 11. Large-package spindle bolsters (SKF Industries)

IMPROVEMENT of throwing and winding equipment has for the most part been for the purpose of obtaining greater uniformity of product and meeting the requirements of heavier and larger packages and higher speeds. Several new winders and twisters have made their appearance and other equipment shows important refinements.

Until 1936, soaking of rayon was carried out in the conventional silk-soaking tubs. That year Johnson Engineering & Mfg. Co., Wilkes-Barre, Pa., announced a special machine for soaking and tinting rayon. Recently this company has brought out an improved three-arm machine for mills with limited production requirements. The new model has one-half the volume of the larger machine and is equipped with an improved triple-action spray system, which throws a uniform spray from opposite sides and from below—all without damage to the delicate filaments of the skeins. Average production of this machine is 225 lb. of yarn an hour. It is stated that the increased coverage and uniformity of tint obtained with the new spray system combine to produce a decided improvement in the quality of the yarn. A touch-control switch controls the three revolving porcelain arms.

A rayon skein soaking machine which has not been described previously is the Calhoun-Giles machine sold by J. V. Calhoun Co., Philadelphia. This equipment is available either as a double-unit machine for use in large throwing plants or as a single-unit machine for use in small plants. With a normal cycle of 3 min. soaking, the double-unit machine has a production of 800 lb. per hour; the single-unit machine, 400 lb. per hour. Tests have shown that a 2-min. cycle can be used, in which case the production would be 50% greater.

The rayon skeins are loaded on the poles and placed in the machine on one side and removed on the opposite side, thereby permitting continuous operation of the machine, with no time lost during loading and unloading of the skeins. While the skeins in process are revolv-

ing, they are being sprayed with the soaking solution from the top, as well as being suspended for several inches in the soaking solution at the bottom of the tub. Each pole holds one book of rayon skeins, and there are two poles in a tub during the operation. A third pole is provided to permit loading and unloading without interfering with continuous soaking.

The soaking solution is pumped continuously from the bottom of the tub through a filter and then through the sprays over the rayon skeins. In addition to the circulating pump, there is another small pump governed by a constant-level mechanism that keeps a constant level of solution in the soaking tub. Tubs are lined with stainless steel. Time clocks and lights are provided, so that the operator can definitely time each batch. An automatic temperature-control instrument maintains the desired temperature in the tubs. The solution is heated by means of an electric heater in each tub, or a coil can be supplied to utilize steam if desired.

Two new winders—a single-deck machine and a double-deck machine—have been developed by Fletcher Works, Philadelphia. The framework of the machines is of heavy construction and well braced to prevent vibration. Incorporation in the machines of the change-gear principle permits speeds to be varied in the lower speeds by approximately 10% and gradually decreased to 6% at high speeds. The traverse bars are moved by heart-shaped cams which are milled for accuracy to produce properly wound bobbins. The traverse is also changed very readily by means of the change-gear principle. In the construction of the traverse motion, special attention has been paid to eliminating the teetering action of the traverse bars. The bars are in tension in either direction of the stroke; this principle eliminates ridges in the bobbins and allows the machine to run at higher speeds. A unit control, such as is used on Fletcher twisters, is on the end frame and carries all of the driving elements, thus eliminating objectionable torsional strain on the friction roll shafts. The fingers which hold the spindles are provided with replaceable oilless bearings of impregnated dogwood. Driving pulleys for the spindles are 4½ in. in diameter. On the double-deck winder there are four driving shafts—two for each deck.

An exclusive feature of the winders is a balance wheel on the end of the motor shaft. This allows the operator to stop the machine at any time without putting up the spindles. The weight in the wheel carries the machine to a very slow stop and does not allow the swifts to run ahead. When the machine is started, it comes up to speed slowly and will not break the ends of the yarn. A V-belt is employed on the motor drive. In the double-deck winder, each deck is independent of the other.

For use in unwinding rayon from skeins, F. A. Lazenby & Co., Inc., Baltimore, Md., has brought out a light-weight aluminum barrel runner. The standard spool is 9 in. in diameter and 6 in. wide, but other widths are obtainable to suit the requirements of individual mills. Likewise, bearings are bored to suit the size of the supporting arm according to mill specifications.

A recent development is the Adjusto-matic swift offered by Atwood, Crawford Co., Pawtucket, R. I. Features of the swift cited by the manufacturer are the following: the swift is instantly adjustable to size of skeins; yarn is spooled to the last inch; swift is always balanced; yarn is under tension from the time the skein is placed on the swift until it is completely unwound; the swift automatically expands as the skein is wound off; there is no bunching on cross members; less breakage occurs; the skein can be applied with one hand; and all wire parts are of stainless steel.

Features which have been incorporated in a new twister announced recently by Atwood Machine Co., Stonington, Conn., include a new spindle-swing assembly, an improved twist mechanism, a sliding motor drive, and a new composition-faced finger. The advantages of the new spindle-swing assembly are as follows: The swing stand is mounted directly on the pipe girts, doing away with spindle rails entirely; besides simplification, this makes for complete flexibility as regards spindle spacing; spindles and fingers are moved at will to any desired spacing. The swing has an exceptionally rigid two-point support with both bearing surfaces bronze bushed and with larger bearing area; this is said to assure free running action. The swing stud is much heavier, and, in fact, construction throughout is stronger to meet the modern requirements of heavier and larger packages and higher spindle speeds. Fewer parts are employed in this spindle assembly than ever before. A precalibrated, permanently accurate spring tension is built into the swing. Permanent spindle plumbness is obtained by three handy leveling screws, which make it easy to put the spindle on the machine in perfect vertical alignment.

The improved twist mechanism is 10 to 1 reduction, 100% ball bearing, with silent-chain drive running in oil to the take-up drive-shaft. This greatly simplified assembly with fewer gears and a minimum of high-speed parts is designed to save power, reduce wear, and prevent oil leaks.

The sliding-motor drive is designed to maintain uniform belt tension, regardless of belt stretch or load changes. The new tension adjustment employed is exceedingly sensitive, since the motor is mounted on four inclosed ball-bearing wheels. Two adjustable springs permit the right amount of belt tension against the motor pulley and spindles.

Use of a replaceable finger facing means that the fingers will not wear out, besides eliminating wear and tear on the bobbin gudgeons. The detachable face which can be replaced in a few seconds, is made of one of the tough, modern synthetic materials, accurately dimensioned and long wearing.

Designed for big packages is a special twister of rugged construction introduced this year by U. S. Textile Machine Co., Scranton, Pa. The machine will build a parallel package weighing up to 3 lb., and the spindle can handle a 9-in. spool. A feature of the twister is an improved stop motion which prevents chafing of the yarn by removing the take-up package from the face of the friction roll as soon as an end is broken on the supply spool runs empty.

Another development not previously described are large-package, high-speed rayon spindle bolsters announced by SKF Industries, Inc., Philadelphia. A feature of these bolsters is the large bearing capacity. A precision bronze step bearing is located in the foot of the bolster and permanently assures the correct alignment of the rollers on the blade. In addition to a superior type of bearing mounting, these bolsters also have a large-capacity damping mechanism which combines the advantages of a sensitive oil damping system with the large absorbing powers of a ring-brake friction medium.

On its redraw frame, U. S. Textile Machine Co. has applied an ingenious graduated-tension device which automatically applies a leather-band brake to the tension shaft when the yarn runs slack and removes it when the yarn tightens, permitting a speed of 2,400 r.p.m. Another improvement is an automatic measuring device which stops the receiving bobbin when it reaches a predetermined size.

Also developed by Johnson Engineering & Mfg. Co., is a new self-stacking bobbin board which makes possible the nesting and stacking of bobbin boards with a predetermined clearance between the bobbin heads, thus eliminating load and pressure. The stacked boards can be transported safely as a unit by using a lift truck, and shelf trucks and stationary racks are not necessary. The boards are rust proofed and can be used for steaming and conditioning.

Within the last few months a number of refinements have been made by Universal Winding Co., Boston, Mass., in the design of the No. 50 winder and in the attachments used with it. One of these improvements is the development of the extra-wide anti-wear tension,

designed for use with the long cone. Its wider surface allows a wider angle between the supply and the ends of the cone. The yarn dwells a shorter time at the top corners, and wear on the tension is reduced.

All idler pulleys on the No. 50 winder are now manufactured with Oilite bushings and Alemite fittings. The oil chamber is filled through the Alemite fitting with a special lubricant which is absorbed by the Oilite bushing and increases its life. The advantages of this system of lubrication are that supervision is reduced to a minimum, since each pulley needs attention no more than once a year; and there is no chance of oil getting on the driving belt. All pulleys are now made from die castings and are wider, giving increased traction and power. The standard frame is now equipped with Oilite bushings forced into the spindle bearings. While these bushings might be operated for 3,600 hours without oiling, protection has been added in the form of an oil wicking, which takes the place of the oil ring used previously. Just enough oil to saturate the felt wicking is sufficient; only monthly inspection is necessary.

Other new features of the frame are the addition of an Oilite camshaft bushing which replaces the previous cast-iron one, and a grease chamber which lubricates the camshaft through the Oilite bushing. Inside the casting the boss on the front camshaft bearing has been increased to allow for this cored grease chamber, which is filled through an Alemite fitting.

An extremely sensitive sizing mechanism has been developed recently for automatically stopping the winding spindle when the package has reached a desired diameter. The stopping is accomplished without any pressure by the thread guide against the package.

The stopping and breakage levers on the No. 50 are now made from $\frac{1}{8}$-in. drill rod, hardened and chromium-plated, as this material is sturdier and less apt to be bent and thrown out of adjustment by operators. One end of each lever is bent at right angles and fits into a die-cast hub. The stud hole in this hub is larger than before, as it has been found that the greater bearing surface on the stud and hub reduces wear and insures the close fit necessary to the proper adjustment of stopping lever and wheel. The new stopping wheel is solid, and there are four prominent notches on the rim which provide positive stopping.

The traverse-frame dog segment and brake lever have been redesigned and are now fitted with replaceable steel locking points. This avoids the necessity of filing the locking points for accurate locking, insures against the possibility of faulty dogging, and also materially prolongs the life of the segment and the dog.

Other new winding developments are the adaptation by Universal Winding Co. of the No. 90 winder to flat quilling; and the announcement by Fidelity Machine Co., Philadelphia of a new cup-build attachment for Fidelity-Altemus bottle-bobbin winders which rides in with the yarn for close wind.

YARN CONDITIONING—1. Improved conditioner (Industrial Dryer Corp). 2. Conditioning and twist-setting machine (Lydon Bros.)

ALTHOUGH SPECIALIZED equipment for conditioning rayon yarns and setting the twist in rayon crepe has been available for only a comparatively few years, it is meeting with wide acceptance. In the last twelve months marked improvements have been made in the construction of conditioning machines with a view toward greater uniformity of treatment of the yarn.

The H-W conditioner, manufactured by the Industrial Dryer Corp., Stamford, Conn., is now lined on the inside with stainless steel or Monel metal over a welded-steel frame, while the outer covering consists of a Johns-Manville board made up of asbestos fiber and Portland cement, so that both inside and outside are entirely rustproof. The conditioner is arranged for either steam or electric operation and is equipped with a 12-in. temperature and humidity controller and recorder, motor, time clock, and other equipment for complete automatic operation. Means for creating both temperature and humidity are located between the ceiling of the conditioning chamber and the roof of the conditioner, thus assuring a dry ceiling at all times. Distribution of air is uniform, so that all of the material being conditioned receives exactly the same treatment.

Improvements in the conditioning and twist-setting machine put out by Lydon Bros., Jersey City, N. J., include a system of cross-flow circulation by means of which a large volume of humidified air is blown uniformly across the loaded shelves of the truck, so that the bobbins receive equal treatment whether they are located in the top or bottom rack, in the front or in the rear. Versatility has been gained by changes in design, and the equipment can be used for several different purposes by the addition or elimination of certain items. For instance, the machine can be arranged to set twist or condition cops for weaving, or to handle cones for knitting. Also, yarn can be conditioned to a certain definite regain when it enters a process, and the finished product can be conditioned in the same manner. The machine is now built to use low-pressure steam, as well as electricity.

CUT RAYON—1. Sectional apron dryer (Philadelphia Drying). 2. Double-bladed cutter (F. J. Stokes).

WITH THE increased use of rayon staple, machinery manufacturers are now beginning to give thought to the development of the equipment designed specifically for that material.

An example of such machinery is a sectional apron dryer for staple rayon, made by Philadelphia Drying Machinery Co., Philadelphia, in which three important improvements have just been announced. The first improvement is a new sectional apron which has only about 2½% of the total apron area restricted, as against 10% in the older types. As there are such a large number of sections in the dryer, actual restriction per section is negligible. As a result, the wet spots that heretofore had been prevalent, due to the lack of air circulation at the hinged joint, are no longer present.

A second refinement is an improved, air-tight panel construction. To obtain a suitable drying rate of staple fiber, it is necessary to have an appreciable pressure drop through the material.

Therefore, the portion of the dryer between the circulating blowers and the top of the bed of material is under an appreciable pressure. Also, on the return side there is an appreciable partial vacuum between the air leaving the return bed and the blowers. The improved panel construction eliminates any appreciable air leakage or air infiltration, and therefore permits a high pressure drop to be maintained through the bed of material, giving a rapid rate of drying.

The inside of the dryer is essentially a smooth surface. Both inwardly and outwardly projecting structural framework to support the dryer panels is eliminated. The smooth construction of both the inside and outside of the dryer facilitates cleanliness, by eliminating corners for the accumulation of fly or lint.

The third improvement is the use of centrifugal-type, high-pressure, high-economy blowers to obtain the required air circulation through the bed of material.

Suitable corrosion-resisting alloys are used where necessary, as on the apron conveyor and other parts.

Two machines for handling rayon staple have been brought out recently by Davis & Furber Machine Co., North Andover, Mass. The first is an opener to prepare the staple for either woolen or worsted carding. It is adapted to all lengths of fiber and is said to be particularly useful in opening and fluffing the high-density bales which are imported from Japan. Production is about 1,000 lb. per hour. The second new machine is a card for handling rayon staple on the worsted system. It has a special feed-end and breast single cylinder of 60-in. diameter, and is clothed throughout with D & F hardened-point metallic wire. The card is made with a balling head or can coiler, as desired. It is said to turn out a large production of high-quality work and to require less stripping.

Increased production of cut rayon waste and flock is made possible with an improved rotary cutter with double-bladed knife now being furnished by F. J. Stokes Machine Co., Philadelphia. Although the knife or blade holder rotates at a slightly reduced speed as compared with the older model, the machine makes up to 500 cuts per minute on as many as six strands of material and is fully adjustable for any length of cut from ½ up to 2½ in. Special models are available for making cuts anywhere from 0.003 up to 6 or 7 in. long. At present the company is developing a new model of this cutter which will have an adjustment that can be set to make cuts anywhere from the very shortest to the very longest of about 8 in.

WARP PREPARATION—1. Rayon sizer arranged for cotton system. 2. Rayon sizer arranged for silk system (1 and 2, Chas. B. Johnson). 3. Leasing device (Steel Heddle)

TWO DEVELOPMENTS in warp sizing equipment which were announced barely in time to be noted briefly in last year's review were the introduction of combination sizers which can be used on either the silk or cotton system and the production of high-speed seven-cylinder machines. Machines embodying these two features have rapidly gained favor for sizing both filament and spun-rayon warps.

One machine of this type is a seven-cylinder sizer made by Charles B. Johnson, Paterson, N. J. A feature of this equipment is a combination end which permits the machine to be changed over in a short time from one system to the other. In the latest model the end is being made heavier and the beam is not carried by long bearing arms, as was the case heretofore on cotton system slashers. Instead, two heavy cast bearing frames, sliding on rigid tracks, permit the bearings to be brought up close to the end of any width loom beam. There are no long bars to vibrate and sag; consequently the beam receives the warp under even and continuous tension. Furthermore, the position of these movable bearings can be altered during the operation to align the loom beam with the warp, by a single hand operation at the side of the machine.

Several improvements have been made also in the Zell rayon slasher made by American Obermaier Corp., Long Island City, N. Y. As the machine is now constructed, in addition to the supply of hot air induced into the skeleton cylinders by fans and blown out through the warp, numerous perforated hot-air pipes are used to blow air on the warp, particularly at the feed end and where the yarn passes from one skeleton cylinder to another. It is stated that this arrangement eliminates the danger of marking the warp. The tension arrangement of the feed end has also been improved. Stretch can be controlled between the feed rolls and the size box, and between the size box and the beaming head.

An ingenious leasing device to be applied to the front of slashers operating on the cotton system has been made available by Steel Heddle Mfg. Co., Philadelphia. This attachment, known as the Stehedco leasing device, was invented by S. J. Adams, general superintendent, Spencer Mills, Spindale, N. C. Since a lease permits the yarn to run straight to the harness, production of a higher quality fabric is facilitated. Employing a multiple-hook reed, the attachment permits production of a lease in 2 to 3 min., as compared with 20 to 30 min. by hand. Each dent of the hook reed contains six hooks placed 1 in. apart. The section warps are placed ½ in. apart in the reed by means of special rods and holders. This spacing of hooks and warps gives two warp sheds between each vertical pair of hooks. The reed is raised and lowered by a handwheel and a handle directly below the handwheel shifts the reed sideways. The reed is first shifted in the direction which will place all ends against the plain side of the reed dents and then is raised until the ends from the odd-numbered beams are passed by the hooks. Next, the reed is shifted so that the ends rest against the hook side of the dents and a slight raising of the reed serves to catch the even-numbered beams in the hooks. The shifting to the plain side now leaves the even-numbered beams in the hooks and permits the odd-numbered beams to pass them upon the subsequent full raising of the reed.

At this point the first lease rod is inserted in front of the expansion comb. The reed is then returned to the starting position and the operation described above repeated to catch the odd-numbered beams, allowing the even-numbered beams to pass to the bottom of the reed when it is raised. The second lease string is then inserted and the two strings are passed on to the loom beam. A lease taken this way must travel only about a yard before it is on the loom beam, practically eliminating any possibility of the ends breaking, such as was present before,

when the lease had to pass through the size box, over the drying cylinders, and through the expansion comb.

Spacing of the section warp sheets with the multiple hook reed as a background permits immediate detection of any break which may occur either at the back or more often at the split bars. This is advantageous, as often with the reed at the back, an end will break at the beginning of the beam and will run this way until the beam is full and not be discovered until the lease brings out the fact that it had become crossed in the section comb. It is no longer necessary to stop the slasher on taking a lease, except for 10- or 12-beam sets, and then only for a few seconds.

WEAVING—1. Section of S3 loom showing wide shuttle boxes and race plate for flat shuttles (Crompton & Knowles). 2. Triangular quill (Southern Shuttles). 3. Model LL portable warp-tying machine (Barber-Colman).

IN RAYON weaving the outstanding development of the year is the introduction of the flat quill to increase shuttle capacity. This innovation, which has been discussed at length in the November, 1936, and July, 1937, issues of TEXTILE WORLD, reduces shuttle changes, resulting in fewer loom stops on non-automatic looms and in fewer joining marks on automatic shuttle-changing looms. For use with the flat quills, new types of shuttles have also been brought out.

The flat quill was introduced in this country by Alfred Suter, New York, American representative of the Swiss firm, Maschinenfabrik Ruti. Various types of flat quills and shuttles are now being produced by U S Bobbin & Shuttle Co., Lawrence, Mass.; Silk City Metals Coating Co., Paterson, N. J.; Pavia Shuttle Co., Allentown, Pa.; Shambow Shuttle Co., Woonsocket, R. I.; and Watson-Williams Mfg. Co., Leicester, Mass. A still more recent development than the flat quill is the triangular quill and tapered shuttle brought out by Southern Shuttles, Inc., Greenville, S. C.; this combination permits use of a low shed and reduces the possibility of smashes due to trapping of the shuttle in the shed.

To insure a firm grip on flat bobbins without any necessity for forcing them into tight shuttle clips and thereby risking their being damaged, Watson-Williams has equipped a new shuttle with an expanding ear clip. In addition, Charles Bond Co., Philadelphia, has made available a double-end picker for use with flat-bobbin shuttles in cases where the picker stick is not in the center of the box; it is built with three plies on one side and one on the other.

First brought out some five years ago, the S 3 silk and rayon loom manufactured by Crompton & Knowles Loom Works, Worcester, Mass. has just been made available in a model which will handle a flat shuttle $16\frac{1}{2}$ x $1\frac{13}{16}$ x $1\frac{1}{4}$ x $1\frac{1}{16}$ in. The wooden lay corners can be covered with felt, corduroy, or other material. With the exception of the changes made to handle a flat shuttle, the new model is identical with the other members of the family.

During the last twelve months Draper Corp., Hopedale, Mass. has made a number of changes and refinements in the mechanisms for single-shuttle rayon looms. For example, one improvement displayed at the Southern Textile Exposition, was a scale and pointer applied to the constant-warp-tension friction let-off on the rayon dobby model to show the fixer when a resetting is necessary. On a similar loom, equipped with a cam harness motion, a new design of cam with an improved narrow-gage spring top operates as smoothly as a dobby.

For tying-in warps behind the loom, Barber-Colman Co., Rockford, Ill., has announced a new portable machine. This machine, called the Model LL, combines certain of the features of the Model LC for cotton and the Model LS for silk and rayon. It can be adjusted to tie from a flat sheet or from an end-and-end lease. With the new model, either cotton, silk, or rayon can be tied with only minor changes which can be made in less than 5 min.

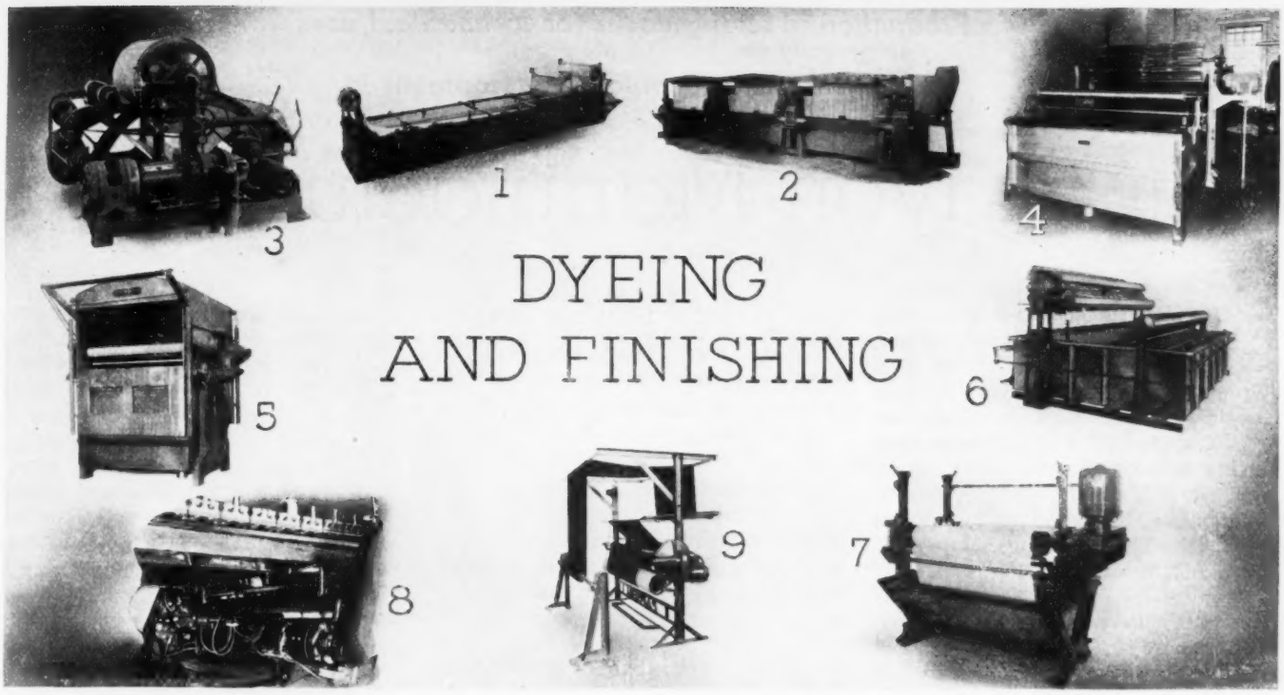
Other rayon weaving devices which have been brought out since last September and which have been noted in earlier issues of TEXTILE WORLD include the following: chromium-plated reed produced by Greensboro Loom Reed Co., Greensboro, N. C.; reed spring which serves as a shock absorber on the beat-up, developed by Rhode Island Warp Stop Equipment Co., Pawtucket, R. I.; and an adjustable loom temple announced by Silk City Metals Coating Co., Paterson, N. J.

DYEING & FINISHING

AN INTERESTING development of the year is the fact that several manufacturers who previously did not make equipment for handling rayon piece goods have expanded their lines to include such machines. In addition, some of the companies already in the field have made considerable improvement in certain types of their equipment.

One piece of equipment which has not been described previously is an initial wetting-out machine developed by Van Vlaanderen Machine Co., Paterson, N. J. This machine is used in the handling of a wide range of fabrics made from filament rayon and staple rayon. It is designed to wet out the cloth in preparation for the boiling off, and to insure a minimum of mark-offs on cloths in processing at this point, by the fact that the goods are conveyed through the liquor at the proper speed, thus eliminating any distortion due to pull and uneven shrinkage.

Van Vlaanderen has also announced an entirely redesigned jig equipped with stainless steel tub, stainless steel immersion rolls, stainless steel expander arrangement, sturdy cast-iron side frames, channel cross girts acting as overflow troughs, and a chain-driven take-up arrangement to handle fine fabrics. Other recent developments of this company include the following: redesigned full-width open soaping and washing machine which can be used either as a print washer or a desizing machine; a stainless steel rod type expander which has been equipped with oilless bushings and stainless steel rods to insure long life and maximum efficiency with the least possible care and attention and to eliminate the possibility of rust spots; a padding machine with variable-speed control, adjustable pressure and two-way lace-up; an improved two-roll, high-speed embossing machine; an improved high-speed decating machine so designed that it can be run by one operator; and a high-pressure calender said to be so designed and so lubricated that the power consumption of this unit is half that of previous models—on this



DYEING AND FINISHING—1. Initial wetting-out machine. 2. Open-width soaper and washer. 3. High-speed decating machine (1 to 3, Van Vlaanderen Machine). 4. Stainless steel dye beck (Riggs & Lombard). 5. Piece goods dyeing machine (Smith Drum). 6. Reel dyeing machine. 7. Improved jig (6 and 7, Hinneken Machine). 8. Cloth-guider motors on Winsor & Jerauld tenter (General Electric). 9. Inspecting and measuring machine (Hermas Machine).

machine smooth acting controls insure proper handling of the goods and an individual self-contained pressure arrangement assures uniformity in production by maintaining a maximum reserve of pressure.

A new large-capacity reel dyeing machine for woven and knit rayon fabrics is now being offered by Riggs & Lombard, Inc., Lowell, Mass. Stainless steel construction, including tub, reel, pinrail, etc., assures long life and freedom from dirt and stains. A sloping back minimizes tangles and tie-ups. The entire weight of motor, reel, and drive is carried on outside separate cast-iron stands, thus relieving the tub of all-driving strains. A similar model with cypress tub is also available, in which a stainless steel lining for the slope and bottom of the tub is sometimes added to eliminate rub marks.

In addition to the automatic cake-purifying equipment noted previously, Smith Drum & Co., Philadelphia, has introduced a reel-type, stainless steel piece-goods dyeing machine which was shown at the Southern Textile Exposition and described in detail in our May issue.

Still another stainless steel reel machine has been brought out by Hinneken Machine Co., Inc., Paterson, N. J. This company has also announced a stainless steel jig, and an embossing machine. The embossing machine has a steel roll 8 in. in diameter. The purpose of the large roll is to secure equal pressure at all points. Bearings are of the heavy-duty type and are oiled automatically. To avoid shifting of the pattern and consequent cutting of the goods, both steel and paper rolls are micro-set to fine adjustment.

For use in dry finishing fabrics composed of rayon-woolen and rayon-worsted blends Curtis & Marble Machine Co., Worcester, Mass., has just announced a combination steam brushing and dewing machine. This tandem machine was developed specifically for handling staple-rayon and wool blends and is said to give a superior appearance and hand on such fabrics.

Several exclusive features are embodied in the Model GF 290 inspecting and measuring machine manufactured by Hermas Machine Co., Hawthorne, N. J. Originally developed for use in the new plant of Carter Fabrics Corp., Greensboro, N. C., the machine is now being made generally available. One important feature is that the let-off roll unit is placed behind the operator, enabling him at one time, and without leaving his place, to observe the measuring clock, control the yardage, inspect the fabric on the level or inclined table or through the skylight penetration. The machine is equipped with a free-wheeling take-up roll which can be thrown into neutral, permitting the operator to pull the cloth back if he so desires. It can also be furnished with reverse wind, with choice of tapered-wood collapsible or paper-tube take-up rolls, and is equipped with variable-speed drive driven by ¼-hp. motor, operating from a light socket. The machine is constructed of welded steel, is built in all standard widths and in units which make it possible to rearrange any of the units to meet particular requirements. The machine is designed to measure accurately and, since the measuring drum is metal, it will not change its size nor warp. The clock is connected to the drum through a steel shaft and bevel gears, no chains or worms being used. The cloth is held in contact with the cork-covered measuring drum by a spring pressure roller which prevents slipping.

Early this spring General Electric Co., Schenectady, N. Y., brought out a cloth-straightening control which employs phototubes to detect bowed filling during the tentering process. This device substitutes electric for manual control in the operation of the straightening motor on the cloth-straightening equipment built by Winsor & Jerauld Mfg. Co., Providence, R. I. Other recent additions to the General Electric line of equipment for tenters include d-c. and Type BTA a-c. adjustable-speed motors for operating the swing mechanism; motors with high starting torques for operating the worm gears with which the tenter rails are moved sidewise; new limit switches for controlling the sidewise motion of the rails; high-torque motors with low inertia ratios which make for rapid positioning of the rails to confirm to irregularities in the sidewise motion of the cloth selvages; and a d-c. gear motor and control which afford a uniform cloth tension during the batching of the goods on rolls.

Production of strong yarns for mechanical uses

is outstanding technical development in

Rayon Manufacture

By Harold DeWitt Smith,
Ch.E., Ph.D., F.T.I.
Textile Technologist,
The A. M. Tenney Associates, Inc.

RAYON has opened a new door, during the year under review, and has taken three firm strides into a region which has commonly been thought of as closed to it; namely, the field of mechanical and utilitarian uses. Having crossed this threshold, rayon faces a broad, new horizon where consumption may be far in excess of that required for apparel purposes.

The most astounding step is the substitution of rayon for cotton in the making of heavy-duty tires for automobile trucks and buses. A long and careful cooperative development by tire manufacturer and rayon manufacturer has resulted in an exceptionally strong viscose-type yarn, which, when combined and twisted into cords, produces a tire superior to the best that has been made with cotton. Internal heating, the destructive agency inherent in tire construction, is reduced by the smooth, well-coated cords of rayon.

The second of these steps is the use of this same strong rayon yarn to make a sail for the racing yacht, "Ranger." Who can say what limits the future will set on rayon for sail cloth, for canvas, for duck, for sheetings, for filter cloths, and for all the other hard-working fabrics which have heretofore been made only of cotton or of linen?

The third step is the use of cuprammonium yarn in typewriter ribbons, a field which cotton and silk have shared until now. The rayon ribbon is superior with respect to the sharp, clean writing and is said to have the longest ink life and durability.

Thus, the versatility of the man-made fibers is demonstrated again. Exceptionally strong viscose yarns have been produced ever since Lilienfeld's method was invented some years ago. Gradually, the defects of such yarns (including the very low elongation) have been overcome. This year has seen a group of such special fibers offered, including Cordura in the form of yarn, a somewhat similar product made in Italy, and also the Italian Amba which is being used in the form of a staple fiber to replace cotton in fabrics where strength is important.

New Yarn Structures

Of the great bulk of the regular varieties of viscose, acetate, and cuprammonium yarns, it can be said that the physical properties have continued along the gradually ascending line of past years. For most apparel purposes, these balanced yarns with their remarkable uniformity of all properties are more suitable than those special yarns in which one or two properties have been more highly developed than the rest.

In the apparel field, the last year has seen new yarn structures, rather than new yarn properties. Two of these represent opposite developments in the field of acetate yarns. One is the introduction of 1½-denier filaments in a yarn made in 100-denier size with 66 filaments. This has been found to give a soft and pleasing hand and excellent covering power in woven lingerie fabrics of fine texture. The other is the production in France of 20-denier filaments of flat, ribbon-shaped cross-section in the form of a 100-denier, 5-filament yarn called Cristal. This yarn is being used in special fabrics for jackets, bags, collars, cuffs, and accessories, as well as in satins and velvets for evening wear. It gives a glittering, crisp, grainy texture and will very probably assume a place of some importance in this country.

Use of thick and thin yarns by fabric designers was great during the last year and these novelty yarns bid fair to continue popular. The vogue for solution-dyed yarns has shown no increase since last year.

In Italy, the gap between continuous-filament yarns and spun staple yarns has been bridged by Lenasil, in which the outside filaments of a continuous-filament yarn have been so cut or abraded before twisting as to give the hairy, soft characteristic of a spun yarn by a simpler method than the usual production of staple fiber and subsequent carding and spinning to form yarn.

In Germany, where viscose staple fiber is being pressed into service to replace as many of the imported natural fibers as possible, a number of new types have been announced. One called Hofa fiber has been developed as a substitute for bast fibers, such as hemp, jute, and ramie. Another called Vistra XT is said to have a surface structure corresponding somewhat to wool scales, and an oval cross-section and wool-like crimp. Another known as Hydrophobic Vistra is water-repellent. Lenusa is another wool-type viscose fiber, and Cuprama SK is a wool-like fiber of the cuprammonium type. In this country, there are undoubtedly somewhat similar developments of particular types for particular purposes, which have not yet progressed far enough for announcements.

Production Methods

The increasing demand for staple fiber during the last two years has required developments in production methods which will undoubtedly affect also the existing methods of spinning of continuous yarns. In the viscose process, for example, the much larger output per spinneret, when making staple fiber, is forcing the development of more economical and efficient methods of preparing spinning solutions.

One result in this country has been the design of a larger shredder, a larger xanthating barette or drum, and a larger xanthate dissolver—the first two handling a batch twice the size of the former batches, and the dissolver handling about 20,000 lb. of solution or two full batches from the xanthator. These larger units, while essentially similar in design to the former standardized units, have advantages of lower capital investment per pound of viscose yarn and a more uniform product.

A further step, which is said to be under careful study and experimentation in this country and already in actual plant operation in Germany, is the continuous soaking, ageing, and shredding of the rayon pulp. The pulp is supplied in rolls or ribbons instead of the usual sheets and is fed slowly through a long soaking tank, at the end of which rolls press out the excess caustic soda and then deliver the sheet of pulp to a continuous ager. Because of the small surface of the alkali cellulose sheet exposed to oxidation, as compared to that of the usual crumbs, the ageing can be accomplished at higher temperatures

(50°C.) in less time (6 hr.), and with less degradation from oxidation.

Spinning

In spinning, also, the development is toward simplified continuous operation. With respect to the present standard machinery, a new viscose pot spinning machine, now available in this country, is made without cams and with the Godet rolls in ball-bearings. It has an adjustable traverse speed ranging from 20 to 60 strokes per minute, which is much faster than has been customary. A further feature on this machine is a positive, chain-driven, variable-speed transmission, which permits accurate regulation of pump speed relative to pot speed, by a simple adjustment while the machine is running, rather than by the older and clumsier method of stopping the machine and changing the gears.

Reports from several sources speak of determined efforts to make finished yarn in one continuous process. At Painesville, Ohio, a plant is now being erected for the production of viscose weaving yarn by a continuous process which, it is asserted, will require only 4½ min. from spinning solution to finished yarn instead of the 85 min. now required by the current method of after-treatment in batches. This process is to be used also to make staple fiber.

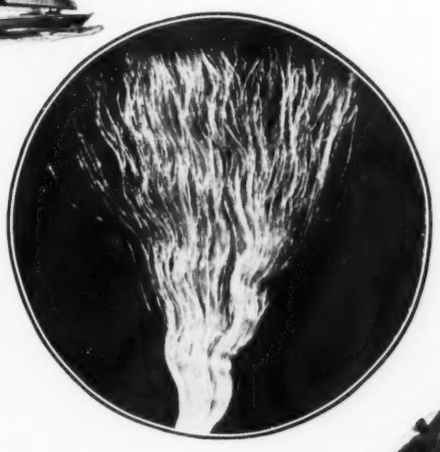
The idea of a rotating spinneret has again been revived in a United States patent recently granted. In this patent, a part of the spinning bath rotates with the spinneret, and the filaments are twisted as they go from the rotating bath to a stationary bath after they have been coagulated.

That greater attention is being paid to the hydraulics of flow through the spinneret is indicated by an interesting change which has become quite general in this country. By the introduction of an insert into the regular spinneret cup, the flow of spinning fluid is concentrated, with the elimination of bad areas of stagnant solution. The insert also provides a better support for the filter. This improvement is said to have reduced costs and speeded production.

A new spinneret alloy of rhodium with platinum has improved the life and efficiency of spinnerets for viscose manufacture. Spinnerets for staple fiber are now made with as many as 3,000 holes hyperbolic in shape (another application of the laws of hydraulics) and with diameters as fine as 0.002 in. with a tolerance of 0.0001 in.

Apart from the radical change in method of aftertreatment of the yarn from the spinning machine, which is embodied in the continuous process mentioned above, efforts to simplify the aftertreatment and to reduce handling by eliminating the skein continue. One manufacturer has invented and put into use a method of washing cakes by centrifugal force, which is stated to be entirely different from existing processes and to give a more uniform penetration and control.

The problem of drying of staple fiber which is cut at the spinning machine and after-treated as loose stock has engaged the attention of drying engineers. One continuous dryer which is in use abroad, consists of three large wire-screen drums. The material is carried around each drum by a mesh belt, and a centrifugal blower within each drum blows air through the thin layer of fibers. A fourth drum can be used after an intervening opening operation in order to condition the fibers to the desired regain. Another dryer consists of a conveyor belt which runs around two large vertical drying drums in a spiral. The fibers drop onto the belt at the top of the machine and are dried during the slow downward spiral movement, issuing at the bottom.



Magnified view of strand of "Cordura" the DuPont yarn for bus and truck tires and sail cloth.

Packaging

There is an unquestionable continuing tendency toward cones and away from spools as a shipping package. Large cones are increasingly popular, and a great deal of yarn is sold on 3-lb. cones, instead of 1½- to 2-lb. cones as heretofore.

Raw Materials

Cellulose remains the principal source of raw material for the manufacture of man-made textile fibers. Cotton linters and wood pulp still provide the great bulk of the alpha-cellulose for this purpose.

That the source of the wood pulp used in rayon manufacture in the United States is about to shift from the spruce forests of the northern United States and Canada to the pine forests of the South is heralded by the announcement that one of the largest northern suppliers of rayon pulp is actually constructing a $6,000,000 plant at Fernandina, Florida, for the production of alpha pulp for rayon from Southern slash pine. The success of seven paper mills which are already operating in the South by the process worked out by Dr. Charles Herty in the Savannah laboratory and the experiments by rayon manufacturers in spinning rayon with alpha pulp prepared in the semi-commercial operations of this laboratory insure the success of this venture. The plant is to be in operation within a year. Its construction marks a milestone of great importance in rayon history.

Other sources of cellulose are receiving serious attention in various parts of the world. In Japan, a process which uses reeds is to be utilized to provide pulp for the rayon industry, and soya bean stalks have also been mentioned as a source of cellulose. In Czechoslovakia beechwood is being investigated. In Italy attempts are being made to produce pulp suitable for rayon from wheat straw and similar annual sources.

In the preparation of pulp from wood or stalks of various plants, a new American method of mechanical disintegration by crushing, instead of chipping, is said to provide a more finely divided material from which some of the impurities have already been expressed. The subsequent chemical purification can, therefore, be milder with consequent improvement in alpha-cellulose quality.

As for new fibers—Lanital still holds a place of great interest as the only non-cellulosic man-made fiber to get out of the laboratory and into commercial production. Its future is still uncertain; but Poland, Holland, and France are either building or contemplating the construction of plants to produce it from their excess milk supply.

New Doors Open to Rayon

Truck tire yarns highlight a year of wide activity

THE 1936-1937 year has been replete with significant developments in the merchandising of rayon. Markets have widened. Trade and consumer contacts have strengthened. And, generally, there has been a vigorous constructive activity along a wide front. The highlight of the year, however, was a development the full merchandising import of which at present can be only conjectured. We refer, of course, to the perfection of two new viscose process yarns of exceptional strength which were placed on the market last spring by the two leading yarn companies, and now are used in heavy truck tires as a substitute for cotton.

This development marks an important step forward in extending rayon's application to industrial use. Undoubtedly the early future will see steadily widening outlets for these new yarns, both in the industrial and consumer fields. Already one of the yarns has proved satisfactory for yacht-sails and is being groomed for various uses where strength is a major requisite, including sewing thread, etc.

With respect to rayon merchandising policy itself, the year had two chief phases: (a) increased effort to get closer to the ultimate consumer; and (b) greater determination by most producers to promote the generic term "rayon", which complemented the trend among retailers to couple the term "rayon" with *all* synthetic yarn brand names in merchandise identification.

The push toward the consumer has been manifest on all sides: one major illustration of course is the closer consumer contact effected by the American Viscose Corp. through its Crown-Tested piece-goods departments which now are spread across the country in some 70 representative stores. Launching of the fiber identification movement last spring merely served to strengthen the rayon industry's own policy of emphasizing the term "rayon" in merchandising and supplying fabric content information to all rayon consuming outlets.

Yarn Shortage vs. Expansion

Second only to the new yarns previously discussed, first place in market expansion must be given to the expanded use of rayon in women's woven underwear; thanks to steady improvement in synthetic yarn, this market which had held steadfastly to silk through the years of rayon's growth, now is gradually turning to the man-made yarn. Important progress in printing and processing of rayon dress goods, making for especially beautiful rayon prints, has served to strengthen consumer acceptance in that field. Likewise the growing popularity of crush-resist velvets stimulated rayon consumption in pile fabrics. Supplementing these developments rayon made appreciable progress in other woven and knit goods, including underwear, shirtings, swimsuits, in jerseys, where the advance was notable, and in pajamas, etc.

Plagued though it has been with customer complaints about slow yarn deliveries, the rayon industry took a "business as usual" attitude toward its merchandising this year. In line with this policy merchandising effort went forward more or less normally, continuing its established activities and pushing now and then into new directions, as exemplified by the Rayon Fete at the Beaux Arts Ball in New York which, the trade agrees, was a brilliantly successful prestige effort. The most significant part of the picture is the attention being given to the 1938-1939 merchandising program. The dominant thought in this program is the realization that the industry must build markets to absorb the additional output which will result from current expansion projects. Details of the 1938–1939 programs are not being disclosed for publication, but from what has been indicated privately, two facts stand forth: (a) the plans are of a scope and type as to make previous promotions seem trivial; and (b) they will address themselves preeminently to the consumer.

From point of market the year's chief developments were a 3c. price advance last April which served only partially to equalize the rapidly rising labor costs, and a swallowing-up of surplus stocks. Financial reports as a whole showed the yarn industry to be in a very favorable position, despite strikes and other interruptions. Rayon weavers enjoyed a somewhat improved position.

Beautiful girls, clad in rayon gowns made from fabrics supplied by the rayon yarn producers, are bringing further prestige to rayon, in the new motion technicolor picture success, Walter Wanger's "Vogues of 1938," starring Warner Baxter and Joan Bennett. Color photography of the rayon fabrics is outstandingly well done. One feature, shown above, is a duplicate scene from last year's "Fete de Rayon Fantastique."

Rayon Mill of the Year

Erected by Carter Fabrics Corp. for the manufacture of fine dress goods

THE model rayon mill erected by Carter Fabrics Corp. was described in brief in the June issue of TEXTILE WORLD. As mentioned then, the building is laid out so that the raw material enters the receiving department and continues on a circular route through the preparatory, weaving, inspecting, and shipping departments, leaving by the same door it enters. The plant is roughly 234x419 ft., of brick and concrete, and with steel columns and beams. Manufacturing departments are built completely without windows in order to facilitate air conditioning and to permit a more even artificial illumination. Glass bricks are employed as an architectural embellishment in the front of the building.

It is a known fact that in old mills with shaky floors there is a tendency toward excessive seconds, due to vibration of machines. Armed with this knowledge, the engineers who constructed the Carter plant built the floor on which heavy machinery rests as solidly as possible on the ground. It consists essentially of a 4-in. slab of tarred concrete, 1½ in. of tarred sand, a 3-in. creosoted sub-floor, 1-in. intermediate, and, for the wearing surface, regular tongued-and-grooved hard maple. This type floor is moisture- and termite-proof, and almost completely eliminates vibration.

The roof is of fireproof construction, designed to prevent condensation and permit maintenance of even temperature, humidity, and general working conditions. It consists of 1½ in. of fiber insulating board resting directly on the steel beams. Over this was poured a monolithic gypsum slab 2½ in. thick, reinforced with steel-wire mesh. The roofing proper, applied directly to this slab, is a 20-yr. bonded, 5-ply, tar-and-gravel Carey roof.

Air Conditioning

There are three separate air-conditioning systems in use: Sturtevant in both the weaving and preparatory departments, and Delco-Frigidaire in the office. Relative humidity and dry-bulb temperature are automatically maintained throughout the year. During the winter, a relative humidity of 60% and a dry-bulb temperature of 80° F. are maintained in the weave room, and a relative humidity of 55% and dry-bulb temperature of 80° F. in the preparatory and throwing rooms. During the summer months, relative humidity in the weave room is constant at 60%, and in the preparatory and throwing rooms at 55%. Cooling obtainable indoors during the hot months depends of course on the outdoor wet-bulb temperature.

The air-conditioning installation operates somewhat differently in winter than it operates in summer. During the cold months, a minimum amount of air is taken in from outside and mixed automatically with portions of room air, after which it passes through the air washer. It is then passed through extended surface fin-type steam heaters, which automatically temper it, and into a system of ducts through which a fan distributes it over the mill. In summer, outside air is drawn through a central-station air washer, which cleanses it of 97½% of the solid matter and cools it. Temperature of the weave room, with 60% relative humidity, is lowered to not more than 16° F. above the outdoor wet-bulb reading. The preparatory and throwing departments, with 55% relative humidity, are cooled to not more than 19° F. above the outdoor wet-bulb reading. Excess air is exhausted out-of-doors by means of aluminum automatic relief dampers located in the walls. A feature of the installation is the air washer, which incorporates self-cleaning filters and capillary media for removing foreign matter from the air.

★ ★

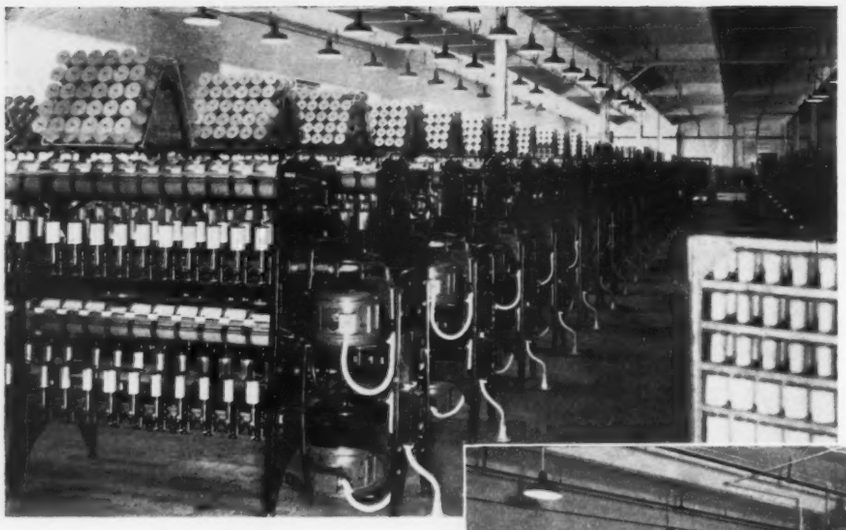
FROM THE BEGINNING everything pointed to Carter Fabrics Corp., Greensboro, N. C., as being *the* mill to be used as a case study in this year's Rayon Issue. It is new. It is complete. Large-package operation is stressed throughout. So are air-conditioning, modern industrial-building construction, latest developments in machinery and everything else necessary to turn out highest-quality goods with maximum efficiency. The plant was aptly and concisely described by W. J. Carter, the president, when he said: "We built the mill around the machinery." It is the rayon weaving mill of the year.

★ ★

Glass bricks embellish the front of the new Carter Fabrics Corp. plant as shown in illustration above (photo by Coxe).

Preparatory Departments

After the yarn is soaked, it is extracted in a Fletcher extractor of the



Throwing department is equipped with latest type of machines driven by Westinghouse motors—Note also even illumination. *Photos by Cuze*

High-speed Cocker warpers, designed to operate at 250 yd. per. min., are located adjacent to the throwing department.

latest type, and dried in a Proctor & Schwartz single-conveyor automatic skein dryer with traveling skein protector. The dryer is equipped with a moving skirt which protects the skeins from whipping or rubbing against the sides of the machine and injuring the yarn in any way. This feature permits loading the poles fully, and makes possible a prescribed path for the air to follow for drying purposes. Advantages are greater capacity, quicker drying, and a better product.

The throwing department contains approximately 11,000 spindles of Atwood winding, twisting, and redrawing; and 1,200 spindles of Whitin fancy twisting. The department also has 37 No. 90 Universal bobbin winders equipped with bunch builders and for winding from an unrolling spool. The machines are designed to wind S- and Z-twist yarns, and are equipped to handle either flat or round cops, as required.

There are two conditioning processes. Before the redrawing takes place, the yarn is conditioned in the latest model Industrial Dryer Corp. H-W conditioner complete with automatic controls. Then, when necessary, the yarn is again conditioned in a similar machine following the winding. The filling is then ready for the weave room.

Spools were furnished by Freeland Bobbin Corp., and are larger than ordinarily used in the rayon weaving industry. These include shipping, winder-spinner, and steaming spools. The shipping and winder-spinner spools have high-specific-gravity fibre heads, and the barrels are of seasoned maple. Steaming shafts are equipped with special tempered aluminum heads treated with an oxide film designed to resist wear, scratching, and corrosion. Bobbin and quill boards and steaming trucks were also furnished by Freeland. Norwich Wire Works, Inc., supplied 560 riveted-pin bobbin boards of 30-pin capacity, and 660 quill boards of 99-pin capacity, cadmium-plated to resist corrosion which might stain or otherwise injure the yarn and cause imperfect goods.

Warping and Weaving

Warping and slashing are carried on in rooms adjacent to the throwing department. There are in use two Cocker high-speed, rayon warpers and three V-type low-speed machines. The high-speed machines are designed to operate at speeds as great as 250 yd. per min. The two slashers were also furnished by Cocker, and are of the seven-cylinder variety equipped with stainless-steel drums, Stewart Warner and General Electric control devices, and Veeder-Root counters. Warps are carried by truck directly to the weave room after they have been doffed.

There have been installed 384 Crompton & Knowles looms. All of these looms are of the latest type shuttle changers, and are equipped to take the flat cop. Features include precision let-off, electric warp stop motion, steel breast beam, extra bearings, and other attachments designed to produce goods with a minimum of stops and seconds. It is understood that the plant could be expanded by several hundred looms without interrupting sequence of operations should the management deem such a plan advisable at some future date.

As the cloth comes off the looms, it is taken into the inspecting room which is adjacent to the weave room. This room is fitted exclusively with Hermas machinery, and, in some instances, special machinery was designed for use here. For example, the inspecting and measuring tables come under this category, although in the future they will be listed as standard Hermas equipment. In one operation, the cloth is inspected, graded, measured, and wound onto rolls ready for the finisher. The machine is so arranged that the cloth travels up from behind the operator, over his head, down in front of a window (or artificial light), and across the measuring drum. In addition to the twelve inspecting tables, this room is equipped with one 58-in. four-knife horizontal shear and one DC rolling and sewing machine. The shear is said to have a production in excess of 100,000 yd. per 40-hr. week.

Electrification and Lighting

Equipment for the general electrification of the mill, including motors, switches, etc., was furnished almost 100% by Westinghouse Electric & Mfg.

Co. Each of the machines in the preparatory operations is individually driven. With the exception of the winders and the redrawing frames, which require special motors, the drives are all standard Westinghouse textile motors. Other than special warp-winder switches and fused switches in the drying operation, all of the circuit-control devices, including lighting panels, motor starters and control, air-conditioning control, and main switchboard, are Westinghouse fuse-less apparatus, employing the latest Deion principle of arc interruption. Thus, throughout the entire plant, there is practically not a fuse in any of the electrical circuits. This construction has two advantages. First, a lower cost of operating is obtained, because there is no part of the circuit breaker that is renewed every time a circuit is opened. Second, there is less lost production when an overload occurs because, without having to wait for the electrician to arrive, and without having to wait until new fuses are obtained the machine operator restores service by moving the breaker handle.

Looms are individually driven by Westinghouse three-point suspension motors and controlled by the Westinghouse fuse-less loom switches. In this loom drive there is an operating advantage in the provisions on the motors for oiling the bearings. There is an oiling tube extending from the motor bearing at the pinion end, up into the clear above the motor, so that the oiler can replenish the oil in the motor bearings without stopping the loom. As a result, there being no need to stop the loom to oil the motor, there is less spoilage of cloth.

The power distribution in the weave room divides the looms into two operating sections, of 400 amperes current consumption, in each section. Each of these divisions is broken down through Nofuze distribution panels into groupings totaling a load of 25 amperes in each circuit, and then each individual loom in these groups is, in turn, protected by a loom switch.

Where the power supply for each loom comes up through the flooring, a new type of waterproof construction is employed to keep scouring water out of the conduit channels. A cast-iron box is placed flush with the flooring, and a new type of Westinghouse cast-iron switch pedestal is placed with a gasketed seal on the floor box.

The glass-brick wall construction of the building presented a new element to be considered when the lighting system was designed. All lighting fixtures were designed for 300–500 watt capacity, spaced at suitable centers, to give 20 to 25 foot-candles general illumination; in every department where special lighting was required, the general lighting plan was modified to give as near shadowless illumination as possible. The weave room is illuminated with 500-watt lamps in R.L.M. reflectors mounted 11 ft. above the floor and spaced on 14-ft. centers. The preparatory and throwing departments are lighted with 300-watt lamps on 9-ft. centers. This arrangement will give approximately 24 foot-candles on the cloth in process in the looms, and about 30 foot-candles on the work in the throwing department. Special lighting is used in the slasher room and at the inspection tables in the inspection department. A high intensity is obtained, through a system of 500-watt units placed suitably overhead and four 300-watt units arranged two above and two beneath each inspection table.

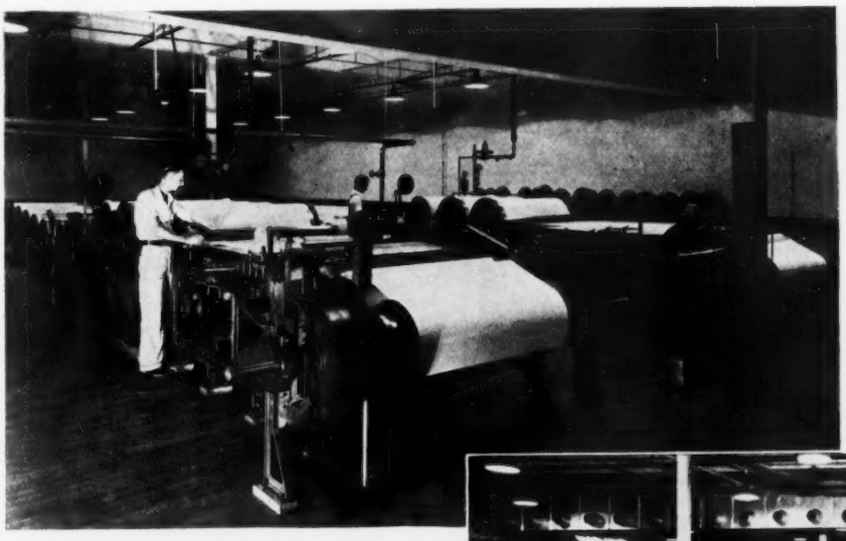
In the large air-intake chambers of the air-conditioning equipment, where the incoming air is washed and a proper humidity established, the lighting fixtures are of waterproof fittings to assure trouble-free illumination in those areas where extreme humidity exists.

Attention to Wiring Details

On the wiring conduits for both lighting and power solderless connectors are used throughout, and all conduit runs are impressive because of their uniformity and alignment. All bends are made to match. This adds greatly to the interior appearance.

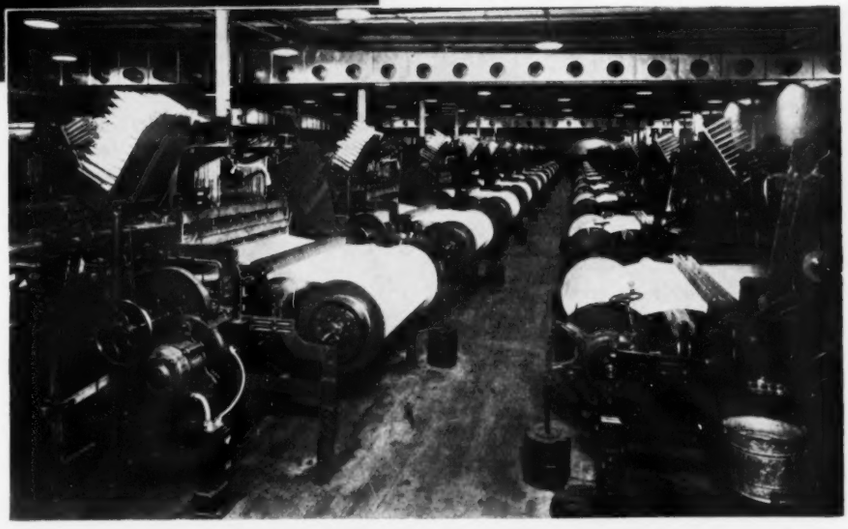
Safety received careful consideration when the wiring was installed. Each machine is individually grounded by flexible bond of $\frac{1}{16}$x$\frac{3}{4}$-in. copper braid brought from the metal frame of the machine to the grounded electrical conduit—800 such bonds tie the equipment to the ground conduit system. The conduit system is in turn grounded at 106 points to the overhead sprinkler system, and there are, of course, grounds at the switchboard and power intake.

The power-supply facilities are also



Slashers are of the Cocker seven-cylinder type equipped with stainless-steel drums.

Nearly 400 new C & K looms powered by Westinghouse motors are in operation in the weave room. Note also lines of ducts for air conditioning.



interesting because of the originality shown in the structural design. Instead of the usual heavy cables swinging from the side of the building to the substation, here is a self-supporting H-frame steel structure with current-carrying parts of 2½-in. extra heavy copper tubing suspended from the steel members by 7,500-volt outdoor-type insulators. There are seven steel piers between the substation and the side of the buildings. A grille-work covers the upper area from pier to pier where the copper is suspended both for protection and to act as a bond and brace between the piers. Where the copper passes over the mill driveway, it is also covered by a sleeving of Micarta insulation, as an assurance that at no time can a vehicle bearing a high load, passing beneath the structure, come in contact with the live copper.

Each of the steel piers is grounded by a copper rod "salted in," to a distance of 10 ft., and through the grille the entire structure is bonded together, and thoroughly grounded as one unit.

At the substation end of the structure are the electrical disconnecting switches, and, as the copper enters the building, lightning arresters are installed. Where the copper passes through the wall of the building, there is a split Micarta panel lapped to shed moisture to the outside.

The advantage of such a power-supply structure lies in the fact it is self-supporting. It places no pull on the walls of the building and it has a more pleasing appearance than other types of customary power-supply intake arrangement. The cost of this structure is no more than the conventional tie between the substation and plant.

Just inside the wall of the building the copper tubing from the substation tie-in is connected to the copper bus structure of the main switchboard of the mill.

In the switchboard is the key to the distribution of cost of power to the different operations in the mill. This switchboard consists of standard steel panels, five of which are type AB (No-fuze) distribution panels and one combination distribution and metering panel. On this latter panel are mounted, in addition to the feeder-circuit breakers, two sets of voltmeters, ammeters, and watt-hour meters. One set is for feeder-circuit readings, and the other for the incoming power bus. The connections from the meters for feeder circuits can be changed from feeder circuit to feeder circuit by means of a meter-transfer switch mounted on each panel.

A comparison of the readings of the feeder-circuit meters with the readings obtained from the power-circuit meter-

Photos by Coxe

Photo by Roberts

Cloth room (at center) is equipped with specially designed Hermas measuring and inspecting tables. Windows are without frames and are designed to diffuse the light as evenly as possible.

Self-supporting power-supply structure (above) with current-carrying parts of 2½-in. copper tubing.

One of the two Sturtevant textile evapo:ative coolers and humidifiers (below) used in air conditioning the preparatory and weave rooms.

ing equipment gives the management of the plant a study on the distribution of all power within the mill operation. The power metering, in addition to giving volt-ampere characteristics, also includes through the watt-hour meter, a record of the total power consumed, a 30-min. interval demand register, and thus, in addition to the total consumption, the maximum demand is also readily obtainable.

Miscellaneous

Powers Regulator Co. furnished the recording and control instruments used almost exclusively throughout the mill. WAK pick counters are installed on the looms. Process steam is generated in a low-pressure Kewanee fire-tube boiler equipped with an Iron Fireman stoker. The boiler is located in a very deep basement under one portion of the plant in order to facilitate operation of return lines. The mill uses city water, and is equipped with a sprinkler system employing a 60,000-gal. reserve tank.

W. J. Carter, formerly a vice-president of Burlington Mills and at present executive vice-president and general manager of S. Slater & Sons, is president and treasurer of the new firm. Harry C. Carter, his brother, who was formerly superintendent of two different Burlington plants, is vice-president in charge of manufacturing, and assistant to the president. R. M. Reid, also at one time with Burlington, is secretary and assistant treasurer. The supervisory staff includes Charlie Harrel, overseer of weaving; W. B. Thomas, overseer of preparation and throwing; Morris Greer, master mechanic. All of these men are veterans in rayon manufacturing, with many years experience back of them. W. L. Register is in charge of the payroll and cost department.

The mill makes fine acetate and rayon dress goods, which are merchandised through J. P. Stevens & Co. About 600 persons are employed at present, and the payroll amounts to approximately $12,000 per week. Mill building was designed by Charles C. Hartmann, architect, and erected by Charles W. Angle & Co. Adams Electrical Co. handled electrical work, lighting, and wiring. Lighting layout and system were designed by Harold L. Ross, electrical engineer. All of the foregoing named companies and individuals are of Greensboro, N. C.

Land on which Carter Fabrics Corp. is located was secured from C. C. Hudson and Julius Cone, who have named the area surrounding the mill Cartersville.

Textile World

September, 1937

Editor: DOUGLAS G. WOOLF

Louder, Funnier—and More Tragic

THE indicated large cotton crop is not what is worrying the cotton industry and the cotton trade. We have had large crops before—and by and large they have meant greater consumption of goods with increased return to farmer, manufacturer and retailer.

The real worry today is the way in which the raw cotton situation has been manipulated during recent years, and the apparent promise of continued manipulation in the future.

Here is the problem: The 9c cotton loan arrangement was made effective by the Administration on the definite condition that Congress would enact cotton crop control legislation next year. That in itself is terrifying enough. The principle of that kind of a deal between the executive and legislative branches of the Government has the most sinister implications. To quote one observer: "Because the Senate does not have the time to give the question of so-called surplus crop control proper thought and study at present, it pledges itself to arrive at only one conclusion after the proper study has been made."

HOWEVER, the cotton manufacturer has no time to tarry over this academic worry. He has much more specific concern of his own. If he sat at the session of the American Cotton Manufacturers' Association convention last May when Senator Bankhead spoke, he will undoubtedly shiver again in retrospect when he recalls the program outlined by the speaker. There was practically every known ornament on that Christmas tree: ever-normal granary, parity price, export bounty, compensatory taxes, quotas, and what have you.

This cotton manufacturer about whom we have been talking knows, if he is a realist, that he will get a variety of these presents next session. He knows that he has a good chance of being presented with his old friend the processing tax, possibly in modern dress. And he may wonder where this thing is going to end.

Students of past efforts of governments toward rigid commodity control don't wonder about that. They think back to Great Britain and rubber, Brazil and coffee—and merely wait for the crash. Sooner or later the scheme has to be abandoned. The agony comes during the waiting period, and when the bubble bursts.

REMARKS of this sort always raise a howl of protest: "You are all for industrial control; why can't you stand for a little agricultural control on the side?"

The answer is easy, of course. There is no point of comparison between, on the one hand, attempts to prevent wage degradation, and—on the other—a plan which has embodied among other things huge payments for failure to plant, plus an attempt to fix upon the country as permanent policy a price structure which happened to exist during a certain period.

If the effects of our whole agricultural program were not so tragic, it would be the funniest thing that ever happened. The laughs started way back when the Federal Farm Board proposed that cotton growers plough under every third row—and they have been getting louder and funnier, and more tragic, all the time.

It is of no avail to point to the "prosperity" which American farmers have enjoyed under the AAA, because one must also remember that the day of reckoning is still ahead. How long will Congress and the Administration shut their eyes to that fact?

The Editor Says

How He Can Take It!

JOHN L. LEWIS' horror at the defeat of the wage-hour bill was a good performance. It fooled everyone except those who stopped to wonder how a man who felt so deeply could have maintained such a noble silence during the days and days when the bill was being slowly strangled to death. Even Mr. Lewis could hardly be such a Spartan as that!

Hillman Struts His Stuff

SPEAKING of good performances, Sidney Hillman was no ham actor before, during and after the silk strike.

Here was the situation: A long series of events in a decentralized and, to a considerable extent, disorganized branch of the textile industry was leading up to one inevitable conclusion. The stage was all set. In marches Mr. Hillman in full battle regalia. After a mighty offensive lasting several days, victory is his! Then came the pronunciamentoes of the victor! Such pompous phrases as this: "I regard the settlements as a step of major importance, not only in the stabilization of the silk industry, but in helping to promote order and stability in the other branches of the textile industry."

Look out below! The inference is clear: "We cleaned up the silk industry and now we'll move in on the rest—especially the southern cotton industry. This victory should serve as a warning that nothing can withstand our attack."

Well, maybe so. But we would suggest that the "other branches" of the textile industry wait for a little more proof of Mr. Hillman's military genius than was provided by the "victory" in the silk strike. Actually, that showed nothing but opportunism: an ability to make something out of nothing.

But, boy, how he can strut!

Remember the Ides of August!

WE dislike to interrupt the fun of those who are having a hilarious time at the wake of the Black-Connery wage-hour bill, but strict duty forces us to suggest that the celebration may be a little premature. Dead as old Marley though such legislation is for the moment, its ghost promises to be walking vigorously through the halls of Congress next year. And our bet is that it will be to many just as frightening an apparition as Marley's ghost was to Scrooge. Also, it will most probably take on new life, and stay with us.

What form will it take in its next incarnation? Franklin W. Hobbs summarizes the opinion of a great many intelligent observers when he writes to the editor of this publication that "we are likely to get a much worse bill at the next session." Our Washington correspondent reflects this viewpoint when he reports, in this issue, that "so possible is passage of a labor standards measure, even a more drastic one, that some congressmen and many observers believe the opposition made a stupid mistake in throttling the Black-Connery bill." He quotes "an able journalist on a deep-South paper" to the effect that "a much more stringent law would be laid in their laps eventually, and they would rue the ides of August 1937."

Of course, that can be no more positive than any other Washington prediction, but let's grant that there is a good chance of its coming true. That's a safe way to figure, at least. Then both proponents and opponents of Federal wage-hour legislation will want to get on the job—the former to prevent faulty legislation from delaying real accomplishment in this direction, and the latter to soften the blow as much as possible.

Our own stand on this matter is clear. We have believed right along that simple Federal legislation which will enable industry to put a ceiling over hours and a floor under wages is not only inevitable but desirable. We believe the textile industry should point its efforts toward that end. Much good work was done by its representatives at the last session; much more will have to be done by them at the next session, and also between now and then. They will need the support of the rank and file. If any of the latter are the least bit hesitant, they should remember the ides of August 1937!

It is not a question of a law against no law, but rather of as good a law as we can get against a bad law—or, from the textile standpoint, even possibly an Ellenbogen Act. That's something to think about!

TO THE EDITOR:

Fears a Worse Bill Next Session

BOSTON, MASS.

Editor, TEXTILE WORLD:

I was very glad to read your editorial in the August issue entitled "Wages and Hours." Of course the bill is dead now but at the time you wrote the editorial I think you were right in assuming that the bill would become a law. In fact, I am not at all sure that its defeat was for the best. I have had a feeling all along that if no legislation was put through at this session of Congress, we were likely to get a much worse bill at the next session. The general idea of wage and hour agreement is certainly right. The only "out" about the bill (and a serious one of course) was the commission, but I think that the bill as passed by the Senate was about as good a one as we shall see in the near future. As I said before, I am afraid we are likely to get something a good deal worse the next session.

FRANKLIN W. HOBBS
President, Arlington Mills

Agrees on Outlook

GASTONIA, N. C.

Editor, TEXTILE WORLD:

I have just finished reading the August issue of TEXTILE WORLD and enjoyed it even more than usual. I especially want to congratulate you upon your editorial as to the present outlook in textiles.

While June and July curtailment in combed yarns was not as heavy as I would have liked to have seen it, I find that it removed 3,750,000 lb. from production, based upon May high production; and many mills have continued some curtailment into August so that at least 4,000,000 lb. must have been eliminated from production on the scale previously maintained. That has aided greatly in holding down inventories and maintaining a better technical position than we had last year when better conditions first appeared.

Congratulations upon this even better than ever issue of TEXTILE WORLD.

FRED M. ALLEN
Secretary-Treasurer
Southern Combed Yarn Spinners Association

In the News

Cotton Loan Just One More Chapter

(From Textile World's Washington Office)

King Cotton and President Roosevelt swapped horses and both think they got the better of the deal. The President traded the South a cotton bonus and loan for a crop control law. That Congress will enact the law next session, which may not be till January, is practically certain. Congress has agreed to enact it, for one thing. Keeping agreements is not fashionable in the world just now. But Congress will have another reason. Cotton producers don't get their bonus unless they sign up under crop control. If there were no control law they couldn't sign up, and they wouldn't get the easy money. Then the same pressure that put the deal through Congress would be applied again.

This story does not begin with this big crop and falling prices. Mr. Roosevelt's AAA, he believed, would have saved the cotton growers from this poverty of plenty. But the Supreme Court emasculated the act. Then the South stood by and let the Senate kill the court reform bill. A crop control law down their throats was his answer. That producers of other crops will have to swallow control-for-scarcity as a result of the cotton deal is incidental, but it's a mighty big incident. Many Americans do not believe in the economy of scarcity.

Nor does this story end with this year's loan and bonus and next year's control law. It is now a platitude that bolstered cotton prices will open the way for low-cost foreign competitive production which can and will reduce this country's 60% export to the skeleton. If continued, many observers believe, Federal aid will wipe out the Southeast and leave only the Southwest growing cotton for domestic trade.

Cold-eyed analysts contend that any goods or services for which there is insufficient demand to maintain an equitable price, should be allowed to settle to their balanced level. They point out the example of Brazil. That country for years tried to bolster coffee prices. What it actually did was start competitive growing in other countries. The Brazilian Government's program had to be abandoned as damaging rather than helpful. If Federal aid is established here, they believe it will eventually be dropped after great expense and market loss.

What form the control law will take is not certain. The Senate Agriculture Committee will frame a bill of its own this fall, and the White House will have one. The latter, especially, is likely to take a new tack. In fact an extremely bright idea is already credited to the President or his aides. Remembering the Court's decision against AAA, the White House has hit upon regulation of, not acreage, but crop marketing. Under such a law the farmer could grow all he pleased, but could sell only so much. The power of Congress to control commerce is established beyond doubt.

Probably the law will carry a 2¢ per lb. processing tax on lint cotton arbitrarily fixed by Congress, to be proclaimed if the Secretary of Agriculture finds that yield will exceed 15% over normal. The tax would be paid by the first processor, in other words the mill. Also expected is a compensating tax to be placed on competitive goods when cotton suffers by reason of increased prices as result of cotton tax. Nothing has been said about a floor stock tax, lack of which would bring up several obvious complications.

Outlook in Textiles

Those who, like the editor of this publication, felt bullish on textiles a month ago, were forced by events since then to postpone their optimism but not to abandon it. Too many circumstances need clarifying before one can look ahead with assurance.

Outstanding among these uncertainties, of course, is the price situation in raw cotton. Here, as is often the case, there is a psychological effect in branches of textiles other than cotton. Events in the latter division are felt throughout the industry.

Naturally, the price break following the prediction of an unexpectedly large crop, plus the uncertainties as to the loan, had a paralyzing effect on goods business. As we write this, the loan announcement has been made, and the September crop report has intensified the bearish implications of the August report. However private estimates had prepared the trade for this, and its effect was partly discounted.

The stock-market drop, particularly the sharp plunge of Sept. 7, also added its unsettling influence.

In commenting on the outlook last month, we expressed real hope for the fall, but stated that this was not a prediction, due to the many questionable factors. The latter have been in full play since then.

The over-all indication is still for expansion in general business this fall, and for a corresponding improvement in textiles. The latter may lag behind other industries a bit, but not indefinitely.

For the balance of the year, an erroneous impression may be created by comparison of current textile mill activity with that prevailing a year previous. For instance, as noted in the TEXTILE WORLD *Analyst* (page 146) the July 1937 rate was slightly (4%) below July 1936. This was the first time in a long while that a month fell below its counterpart of the previous year. However it must be born in mind that activity during the last half of 1936 was at a record rate, and failure to reach that rate during the last half of 1937 will not represent a slump necessarily. In fact, July 1937—although under July 1936—was still 30% above what we assume as "normal". Textile production continues to be above that norm. What manufacturers are most anxious for now is a revival of business which will make further continuation of that production both possible and profitable.

On TWOC Front

Main developments in the campaign of the Textile Workers Organizing Committee during the last month have been in the silk and woolen fields. The former, involving settlements reached after a brief strike, is covered on page 118 of this issue.

In the wool field, the American Woolen Co. agreed to a National Labor Relations Board election in its Lawrence plants. Subsequently elections will be held in the plants in other states. These will determine whether or not the workers wish to be represented in collective bargaining by TWOC.

It is generally believed that the next main objective of the union will be the southern textile field.

"Electric Eye" Picker

Charles H. White, an inventor of Moline, Ill., has obtained a patent on a cotton-picking machine which utilizes the photo electric cell to select only fully matured bolls for picking. He has assigned his patent to a manufacturer of agricultural machinery. Patent office experts have stated that this inventor has overcome a major defect found in some earlier cotton picking devices—that is, the lack of selectivity. It is generally hailed as a development of most interesting potentialities.

Meanwhile the Rust Bros. of Memphis, Tenn., have brought out an improved cotton picker. The new machine has double the picking units of the original one and is equipped with electric lights for night work.

Wage-Hour Legislation

What kind of a bill, if any, is likely to come out next session?

By Blaine Stubblefield
Washington Office, Textile World

WE GAVE our Washington correspondent an impossible task. "Give our readers the low-down on what will happen to the wage-hour bill next session," we requested. With all the political cross-fires which were blazing in Washington as the session came to a close, any predictions for the next orgy are difficult indeed. But, used to doing the impossible, our correspondent came across with a remarkably specific analysis. — EDITOR.

ONE OF three things can happen in the next Congress to the Black-Connery wages and hours bill which was halted in the House rules committee by southern industry while Congress rushed for the exits from Washington's blazing summer. The 40-hour, 40-cent measure had been passed by the Senate.

The bill (1) might be passed approximately as it stands, with apparent conflict between its regional differential provisions and the Green amendments. Or, (2) it might be worked over by either the rules committee or the labor committee (to which it could be returned) and by the House in debate, till few or none of its original features remain. Or, (3) the bill in any form may be defeated by industry, while organized labor faint-praises it from the side lines.

The first possibility, passage as it stands, is remote. Opposition which bottled the bill in the rules committee was not a few willful men but a powerful bloc of "southern industries," including textiles, furniture, ice, woodworking, quarrying, sand and gravel, fertilizer, cotton ginning and crushing, canning and packing.

Foremost in the battle, and leader of the southern group, was southern lumber, which had records to show that pine lumber takes twice the hours per thousand to produce in the South that it does in the West. Lumber and the others claimed inefficient labor and low living costs in the South. The South's claim to natural living advantages, and to its need of those advantages in competition with the North, is backed up partly by figures, partly by intangibles, and is difficult to establish. But there is great political force behind the contention. And economic differential proponents in the South have strong political allies in the North. A great majority of northern industries would not be affected by the 40-40 law. But they are against it in principle; they fear the proposed powerful board which would administer the labor standards law.

The opposition played its hand well, and with a degree of luck. In the House rules committee, a bottle neck where House legislation is sometimes easily throttled, the opponents found nine of the 14 committeemen, four Republicans and five southern Democrats, ready to help check the bill. They hog-tied it so tight that even the rough-tussling Mr. Roosevelt and all his horses and men couldn't loosen it. When Congress convenes they will be on hand with some new hitches.

So passage of the measure as it stands would be much harder than passing it with changes. Three changes are most obvious: (1) Modify the Green amendments, which provided that the Board could take wage and hour conditions set up by collective bargaining in any place and impose them upon employers in any other place, within the 40-hour 40-cent limits set up by law. (2) Make the regional differential provision directly applicable to the South; as it stands the text is rather vague. (3) Lower the 40-cent floor and raise the 40-hour ceiling.

Attempt at all or any one of the three changes will launch heated controversy. Green has one thing to sell—concessions from employers to workers—and he is determined to keep the Government from passing out the same service free under a wage and hour law. John Lewis is selling the same line of goods in competition with Green. But if their harvest field is endangered they will join on that issue, even more effectively than they have already. It would be easy to word the regional differential more directly, but the more clearly it reads the more sharply it conflicts with Green's amendments. And, finally, to lower the minimum wage and raise the maximum hour would be to make a law which, labor standards sponsors think, would be as toothless as a gummy sheep. Thus while the bill probably will have to be changed, the changes will not be easy to make.

For the third possibility—ultimate defeat of the proposal—there is also some fairly credible argument. The Administration's sun is lower in the sky and its rays will not be so hot as they were. The bill, having been beaten, will be under defeated-candidate handicap. Increasing prosperity will further cool the ardor of the crusade for the common man; the voting public will lack interest. Organized labor will continue to pose as a friend of the bill but will not fight for it unless some deal is made with the Administration. The southern manufacturer group, teamed with the northern industrial group which fears the potential power of the proposed board, both encouraged by victory, have taken heart and are preparing to fight; they have time to muster their men and their facts.

But ultimate defeat for some form of wage-hour bill is highly improbable. A measure of this type is second or third on Mr. Roosevelt's list of objectives.

In fact, so possible is passage of a labor standards measure, even a more drastic one, that some congressmen and many observers believe the opposition made a stupid mistake in throttling the Black-Connery bill. One able journalist on a strong deep-South paper told the writer that a much more stringent law would be laid in their laps eventually, and they would rue the ides of August 1937.

And even should the wage-hour project be laid to rest permanently, the ghosts of Ellenbogen textile bills would certainly rise to plague the opponents of labor standards legislation. An Ellenbogen law, as originally planned, would become the nucleus to which other industries would be tied one by one.

Another possibility, in case of defeat for the labor standards bill, would be revision of section five of the Federal Trade act, so that the Commission would regulate employment as to wages and hours. The act as it is declares unfair methods of competition in commerce to be unlawful. It would have to be amended to construe unfairly low wages and long hours by employers producing for interstate commerce as unfair practice and unlawful. The Federal Trade Commission stands high with reputable industry, and it might be expected to administer a wage-hour law successfully. Such a proposal would find few enemies among those who merely fear a powerful labor standards board. But for those who want to avoid wages and hours standards, getting under FTC would be merely jumping out of one frying pan into another.

Modernization Plus . . .

Just a part of management at Riverside & Dan River

WE WENT down to Danville, Va., to get a modernization story about the Riverside & Dan River Cotton Mills. We came back with something more than that—with a management story in its broadest sense.

For after all, as Robert R. West, president, expressed it, modernization of plant and equipment is only one phase of management, and Riverside is trying to keep all phases in mind at once. Consequently it was not surprising to find that the production job being done there has a merchandising keynote. Mr. West gave it to us when he said: "We go on the basis that the raison d'etre for a manufacturing organization is to make something which somebody wants to buy. Consequently we try to keep our whole organization and our whole management policy—whether it be with regard to physical equipment, plant layout or personnel—geared up to the market demand."

Obviously, that means a close relationship between mill and selling office. "Close" is an inadequate term for that relationship at Danville. The two are practically identical. The president of the company, the chief production executive at the mill, the sales head in New York, and the cotton buyer—all know constantly just what the others are doing. Not a yard of goods is produced without the knowledge of the sales office; not a yard of goods is sold without the knowledge of the mill executives; not a pound of cotton is bought without the knowledge of both groups.

The result has been a rather remarkable merchandising-manufacturing accomplishment. This has been three-fold:

(1) Riverside has produced types of goods which five years ago would have been considered impossible in a carded-yarn mill.

(2) It has diversified its product to an extent which seems incredible, in view of its size.

(3) It has adapted high-speed production methods, usually associated with staple-goods manufacture, to the production of this highly diversified range of fabrics.

In fact, this diversification is the most impressive phase of the Riverside job. Retaining its back-log of staple production, the company has extended into an ever-increasing variety of outlets. The great advantage of its position is that it is entering fields where the profit margin is more promising than in staples—but at the same time has retained its advantage as a large organization in the relatively low-percentage burden of its fixed charges. Obviously, this mixture of size and diversification entails a difficult management problem—but the executives at Danville, from Mr. West down, don't seem to worry about extra difficulties.

Effect on Equipment

To get back to modernization and to the effect of these broad policies upon the physical equipment. There are three major lines of activity in this direction:

1. Purchase of new equipment. This has been practically all for replacement purposes since, with the exception of the finishing plant, there has been no increase in capacity.

2. Re-rigging of existing equipment to make different types of fabrics, in line with the product diversification mentioned above.

3. Re-arrangement and re-utilization of floor space.

The latter, in this writer's opinion, has been the most spectacular of the three lines. In a little over a year, the company spent $185,000 re-arranging equipment. And that it was more than a game is evidenced by the fact that there was effected a 10% reduction of labor cost by re-arrangement of layout, and without any change in the wage rates. In a plant of that size, a 10% saving in labor cost makes an investment of $185,000 look like chicken-feed. But it is the will to experiment in this way which appeals to us most at Danville.

This same will is evident in so many ways as one goes about the plant: in the experimentation with glass-brick walls in the bleach-house; in the adaptation of automatic spoolers to use on multi-colored yarn; in the continued extension of air-conditioning throughout the plant; in the handling of the mill-village problem; in the flexibility of the company's key personnel policies, and in scores of other manifestations.

Despite the progress made, the keynote of the organization seems to be—and this is quite appropriate in a company dominated by the experimental attitude—that the job has "only just begun." Well, anyway, it's a good start.

Shawmut Laboratory

Completes cycle of West Point's long-range program of technical control and research

COMPLETING a cycle of steps in a long-range program directed toward improving technical control of cotton manufacturing and establishing the buying and selling of industrial fabrics on an engineering basis, West Point Mfg. Co. has just put into operation a new textile laboratory located on the grounds of its Shawmut, Ala., plant.

When the original West Point laboratory was designed, it was believed to be adequate to provide for the use of specifications and the necessary testing for many years to come. Factors, however, which could not be visualized at that time were the rate of acceleration with which specifications would come into general use, the necessity of process testing under standard atmospheric conditions to make certain that woven fabrics would comply with specifications, the increasing use of fabrics by industry, and the importance of fabric research work in the development of special constructions of cloth to meet special condition. Furthermore, the research work itself has developed special new fabrics of superior qualities to supplant those standard fabrics which have been used in the past as a matter of precedent.

Encouraged by Selling Agent

The West Point group of mills has always been very progressive in the direction of research and technical control and is backed whole-heartedly by Wellington Sears Co., of New York, its selling agent. In fact Wellington Sears has been closely identified with the work of Committee D-13 since it was organized in 1915 by the American Society for Testing Materials. Shortly after the committee drew up its original set of standards, the first real laboratory for the West Point mills was established at Shawmut Mill. About the same time another laboratory was put into operation in the New York office of Wellington Sears, which has since been enlarged.

Specially Designed Building

The laboratory site at Shawmut Mill was chosen because that mill produces many heavy industrial fabrics built to specification and because it is centrally located among the other mills represented by Wellington Sears. The equipment is housed in a 40x60-ft. building, one story and basement, designed by Kennon Perry, architect, Atlanta, Ga. Construction work was in charge of Batson-Cook Co., West Point, Ga.

The front half of the main floor, entered directly from the street through ornamental doors, contains an office, reception room, main hall, service corridor, lavatories, etc. The walls in the reception room are worthy of special mention. On the four main panels are handsome photographic murals by Margaret Bourke-White, portraying various processes in the manufacture of cotton goods. These rooms were decorated and furnished under the direction of Joseph Herbert Barnes, interior decorator, Atlanta.

The test room occupies the rest of the main floor. This room is about 20x40 ft., with generous ceiling height. Side walls, both exterior and interior, and ceiling are thoroughly insulated with rock wool. The ceiling has been given a sound-deadening treatment. Daylight is excluded. An indirect-lighting system is used, employing Edwin F. Guth Co. fixtures, each containing one 250-watt high-intensity mercury-vapor lamp and one 500-watt mazda. General Electric transformers and reacters are provided for each unit. The resulting light has a constant intensity of approximately 65 foot-candles and is of unvarying quality. It has high visual sensitivity and is very nearly the color of daylight. Constant temperature and humidity are provided for this room by means of independent

On reception-room walls are photographic murals by Margaret Bourke-White

Test room is air conditioned and indirectly lighted

air-conditioning equipment. Full automatic controls maintain a dry-bulb temperature of 70° F. and a relative humidity of 65%. By using a refrigerating unit in the summer months and steam coils through the winter, these conditions are maintained throughout the entire year. A recording chart mounted in the test room shows an even red line with only the slightest variations from the desired curve. In order to have this constant all-the-year-round condition, so essential to accurate and reliable testing, careful attention was given all construction details. Air-circulation ducts were carefully planned, walls and ceilings were insulated, and double doors were provided.

Test-Room Equipment

The test-room equipment is of latest type. Additional equipment is being added as required. Working under controlled uniform climatic conditions, the testing engineers can make reliable tests of strength and wearing qualities, as well as determine twist, crimp, hardness, count, regain, etc. Constructions are more easily investigated.

Included in the equipment are: two Emerson automatic electric conditioning ovens; Brown & Sharpe skein reel; Wyzenbeck & Staff, Inc., precision wear-test meter; Belger automatic roving tester (H. & B. American Machine Co.); Alfred Suter stapling device, single-yarn and single-strand tester, direct-numbering yarn machine, twist counter with single-yarn twist attachment and crimp tester; H. L. Scott plied-yarn and cord testers—one plain and one with recording attachment, convertible skein and fabric tester with recording attachment, and two horizontal machines for breaking fabrics—one of which has a capacity of 400 to 800 lb., the other 600 to 1,500 lb., both with recording-chart attachments. There are also numerous gages, pick counters, scales, etc.

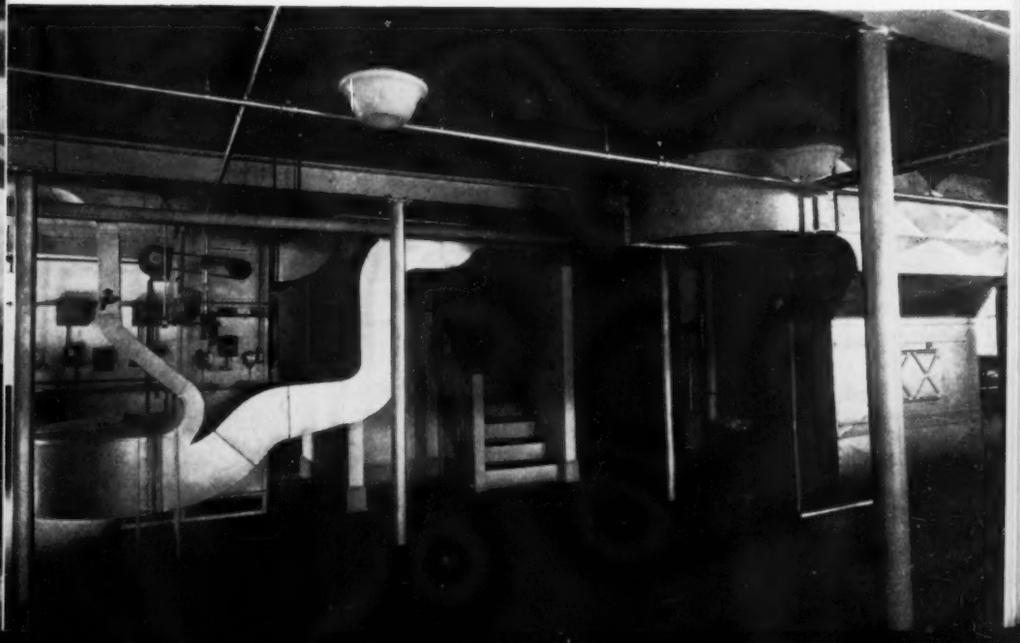
The basement, which is about half above ground, is well ventilated and lighted. The photographic department with laboratory and dark room is located there. It contains cameras, enlarging apparatus, microscopes, stroboscope, and motion-picture equipment. Ample space is provided for records and reports. Also located in the basement is the air-conditioning plant consisting of washers, filters, screens, compressors, motors, fans, and steam coils. There are two separate air conditioners in use. One is for the building in general and is provided with controls that permit frequent changes to correspond with outside conditions. The other system is for the test room only. Both of these systems were designed and installed by Parks-Cramer Co. and use Taylor Instrument Co. controls.

The laboratory will be in a position to handle the increasing number of technical inquiries which are being received as a result of the recent publication of Prof. G. B. Haven's book, "Wellington Sears Handbook of Industrial Fabrics." It may develop fabrics where slight difference in construction makes considerable difference in result.

Investigation and tests are regularly conducted for the seventeen mills comprising the Wellington Sears group. These mills produce 25,000 different constructions, widths, weights, and colors. The goods range from light-weight typewriter-ribbon fabric and balloon cloth up to 12/0 duck weighing 30 oz. a yard in 22 in. width. By a thorough and complete system of checking and testing cotton yarn in process and in finished goods, and comparing fabrics from year to year through changes in cotton-crop conditions, defects are prevented and uniformity of fabric is assured. Officials of both Wellington Sears Co. and West Point Mfg. Co. are confident that with the improved facilities of the new laboratory they can contribute further to the development of cotton fabrics for the products and processes of American industry.

The new laboratory at Shawmut Mill

Air-circulation ducts were carefully planned



3-Ply Silk Strike . . .

300 mills, 40,000 workers affected by T.W.O.C. order

A TWO WEEKS' strike called last month by the T.W.O.C. in the silk textile industry halted operations in some 300 mills employing 40,000 workers in five States. The strike was unique in that it split the industry into three camps: (a) those opposing union domination, (b) those passively accepting it, and (c) those welcoming it. The strike was called Aug. 9 and affected the Pennsylvania and New Jersey silk districts chiefly. By the beginning of the current month practically all mills were again operating on either temporary or permanent working agreements with the union.

The immediate issue, as set forth by the union, was union recognition, higher wages and shorter hours. Underlying that, however, was the aim—which both union and manufacturers shared—of ending the deplorable wage and hour conditions prevailing at the "family shop" end of the industry. The three divisions of the industry—big, medium-sized, and small mills—approached the strike issue from fundamentally different angles, colored by their own wages and hours conditions, but the whole issue hinged on the competitive problem presented by the low wages prevailing in the "family shop" end.

The small mill division, which embraces 175 firms and includes "family shops" of Paterson, N. J. and Allentown, Pa., welcomed the strike as a means of forcing New York converters to pay higher rates for commission work, and these mills closed 100% when the strike was called. In mid-August they signed a union agreement providing for a wage raise which it was estimated would raise labor costs 35%, necessitating a radical rise in rates paid by converters for commission weaving.

The medium-sized mill group, comprising some 100 commission weavers operating between 7,500 and 9,000 looms, took a non-resistance attitude toward the strike and most mills closed; these were spread through Pennsylvania, New Jersey and New England. Under the leadership of David L. Cole, Paterson, N. J., attorney, as counsel, this group organized a trade body to be known as the Silk and Rayon Manufacturers Association, and members authorized the association to act for them in effecting an agreement with the union. An agreement was reached which provided mainly for: recognition of the union as sole collective bargaining agency; employment of only union members; minimum wage of $15 for 40-hour week; binding of union not to contract with competing manufacturers for lower wages or longer hours. Behind the manufacturers' approval of this agreement, as pointed out by Mr. Cole, was the desire to standardize labor costs and to eliminate the downward pressure at that end. Labor costs, it was argued, should not be competitive, and with such costs standardized, competition could develop healthily in its normal fields such as quality of merchandise, styling, etc.

A very different reception, due to fundamentally different conditions, greeted the T.W.O.C.'s strike order among the big mills. These companies comprise some of the major units of the silk and rayon textile industry, including Duplan Silk Corp., Hess, Goldsmith & Co., Inc., Bloomsburg Silk Mill, Schwarzenbach Huber Co., Stehli Silks Corp., and Stunzi Sons Silk Co., Inc. Following violent demonstrations by union sympathizers in Hazleton, Pa., and elsewhere, a number of the mills closed; it was announced that this step was taken to "avoid bloodshed and because the State failed to give proper protection." These manufacturers claimed that they were not involved in any strike, that their workers did not belong to the union and had not gone out on strike and finally—a point tacitly acknowledged by the T.W.O.C.—that these mills pay substantially higher wages and have far superior working conditions than either of the other two groups involved in the strike.

After prolonged negotiations this group, representing some 10,000 looms and 900,000 throwing spindles and employing about 20,000 workers, reached a compromise with the union under which workers returned to their tasks immediately. The compromise further provided that workers could elect a collective bargaining agency in any plant on written request from 10% of personnel; that the employer would deal with any agency so designated and that any grievance not adjusted in 30 days be submitted to three arbitrators, one selected by the employer, one by the collective bargaining agency and a third by the two, or failing agreement on that, the third to be chosen by A. D. Whiteside, president of Dun & Bradstreet; and grievances shall relate to wages, hours and working conditions but shall not include a closed shop.

The first workers' elections held this month resulted in T.W.O.C. victories in most mills. Meanwhile, these manufacturers have formed a new trade body, the Pennsylvania Textile Association, of which James A. Goldsmith, of Hess, Goldsmith, is chairman. The organization is not incorporated and plans in that direction are being held in abeyance pending developments of the present labor situation. The aim of the body is to supply a medium of opinion on mutually important matters, but it is emphasized that all manufacturers signed the compromise agreement individually and will continue to handle such matters individually.

Post-strike developments will hinge on two phases: (a) outcome of the arbitration situation in the larger mills; and (b) converter reaction to the higher rates for commission weaving which the wage increases there necessitate.

Silk Textile Strike Creates Three New Trade Associations

The trade associational line-up of the silk textile industry went through considerable reshuffling during the recent strike. The outcome has been the creation of three new trade bodies, as follows:

Pennsylvania Textile Association. Comprises most of the large Pennsylvania silk-rayon mills. James A. Goldsmith, of Hess, Goldsmith & Co., is chairman.

Silk and Rayon Manufacturers Association. Comprises medium-sized commission weavers of Pennsylvania, New Jersey and other States. David L. Cole, Paterson, N. J., is counsel.

Underwear Fabrics Association. Comprises chief silk underwear fabric converters of New York, N. Y. Temporary officers are: president—J. Howard Hoffman, Excello Fabrics, and secretary—Samuel Cohan, Normandie Silk Co.

Catch-Bar Mystery

Faulty conduct of full-fashioned machine part can often be traced to verge-plate misalignment

By Walter A. Simond

THERE IS nothing about a full-fashioned knitting machine more baffling than the misconduct of the catch bar under some conditions, and these ought to have our careful consideration.

The catch bar seems to be a simple piece of mechanism — nothing but a straight bar of steel about $\frac{5}{8}$ in. thick and $1\frac{3}{4}$ in. wide, with a groove in the front lower edge for the reception of the sinker butts. When mounted in a legger, the approximately horizontal controlling arms are about 3 ft. apart; and at the front of each arm there is a lifting upright connected at the upper end by a ball-and-socket joint.

Small Clearance

The catch bar grooves on some leading makes of machines measure .254 in. wide; the divider butts, .244 in.; and leaving only .008-in. clearance. About .003 in. of the clearance should be allowed to prevent the catch bar from bumping the sinker butts against the verge plates when the catch bar is at the catch position, or farthest forward. In passing, it will be well to point out that the section joints in the catch bar must be aligned by the groove; and the easiest way to get this result when assembling or realigning the sections is to put a piece of steel, shaped to fit the groove, across the joints. When fixing, we can tell if the joints are aligned by measuring to the sinker nibs with a dial gage, being sure the sinkers are in contact with the back of the sinker groove, and gaging the two adjacent heads nearest the joint.

With only .005- or .006-in. clearance to work with and verge plates sometimes several times that distance out of alignment, it is a mystery how the catch bar operates. Do we bump the verge plates which are farthest back hard enough to jar the sinkers back into line where the verge plates are too far forward? Obviously, if the variation is gradual and the extremes several heads apart, it may be possible to adjust and bend the catch bar edgewise to make it cover, but it requires considerable pressure to bend a bar of this width. If, in so doing, we squeeze the oil out of one side of the bearings on the back pivot studs of the controlling arms so as to cause them to heat and score, do we not blame the knitter for failure to oil properly?

Sometimes it will be found that the catch bar does not cover one head without bumping on the next so it will not fall; and in this case the verge plates, jack beds, and sometimes the needles should be realigned.

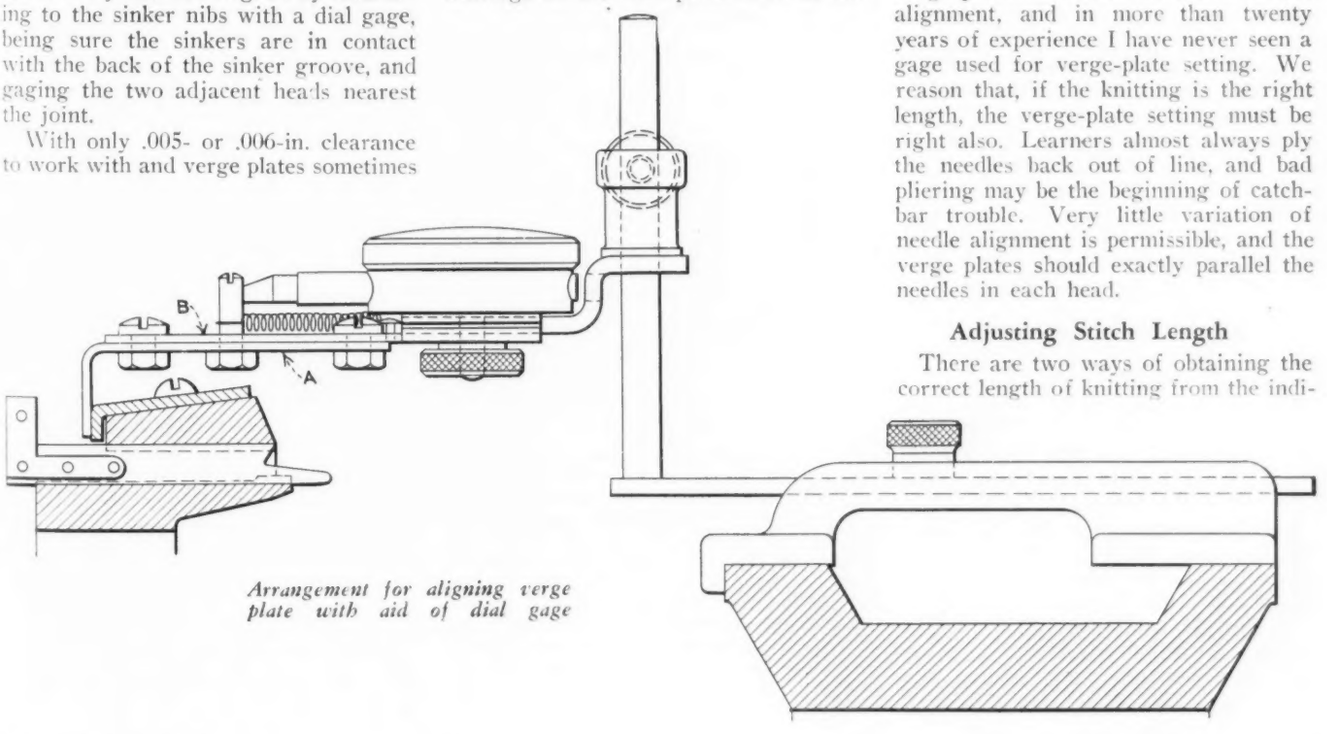
GAGE READINGS ON MACHINE NO. 075

Head No.	1	2	3	4	5	6
C. B.	+000	+004	−002	+006	−001	+005
V. P.	+000	−004	−010	−008	+005	+000	−016	−008	−006	−020	−016	−012
N.	+000	+001	+002	+003	+001	+003	+001	−006	−005	−012	−010	−009

Head No.	7	8	9	10	11	12
C. B.	+000	+004	+002	+005	+013	+004
V. P.	−009	−003	−005	−010	−010	−005	−008	−009	+003	−006	−006	−007
N.	+006	+004	+006	+001	−007	−011	−009	−009	+003	+004	+002	+002

Head No.	13	14	15	16	17	18
C. B.	+000	+005	+005	+002	+004	+005
V. P.	−006	−004	−019	−013	−013	−012	−015	−013	−011	−003	−015	−007
N.	−004	−005	−009	−009	−005	−001	−008	−006	−003	+000	−002	+000

C. B. variation .015″ V. P. = .025″ N. = .018″ Clearance = .012″



Arrangement for aligning verge plate with aid of dial gage

Formerly it seemed that most of the catch-bar trouble was due to incorrect setting of the verge plates, but now it is found that there is very little difficulty encountered when the needles are in perfect alignment. We usually move the verge plates to correct errors in needle alignment, and in more than twenty years of experience I have never seen a gage used for verge-plate setting. We reason that, if the knitting is the right length, the verge-plate setting must be right also. Learners almost always ply the needles back out of line, and bad pliering may be the beginning of catch-bar trouble. Very little variation of needle alignment is permissible, and the verge plates should exactly parallel the needles in each head.

Adjusting Stitch Length

There are two ways of obtaining the correct length of knitting from the indi-

vidual heads of the machine. In both, the needles, verge plates, jack beds, and catch bar are aligned. One of them is a new method recently recommended by one of the leading machine builders. If the knitting comes a little short because of a slightly extra and unavoidable tension of the yarn or silk, where special threading of the guides and thread carriers is required, the needle bar is moved in slightly to obtain the length of stitch desired. On several new machines set by this method the variation was not less than .006 in. on the best alignment. This is a little easier to handle as regards verge-plate setting; but it would be necessary to reset the needle gage for plying the needles in the out-of-line heads and there are slightly variable conditions in dividing, landing, pressing, knocking-over, and narrowing. You may prefer the old way of adding a nick or two on the slur cock and then moving the verge plate just enough to obtain the proper jack clearance. This method should give the most uniform stitch and the best selvages.

As an aid in obtaining the proper alignment of the verge plates, the little attachment shown in the accompanying diagrammatic sketch has been found very useful. It is designed to be used with the horizontal holder for a dial gage which was described in the TEXTILE WORLD of September, 1936. The verge-plate finger slide is marked *A*, and the supporting arm is marked *B*. The slide has a maximum movement of $\frac{1}{16}$ in. and is retracted by a small fine spring which counteracts the spring in the dial gage. The finger is brought up to about a .015-in. minus setting on a correct verge plate and the dial turned to zero. With this setting we can attain an absolute alignment of verge plates or make the slight variation required by the old method.

On an old 18-section machine, dial gaging showed a clearance of .012 in. over the width of the sinker butts. The back of the catch-bar groove varied .015 in. from the line; the needles, .018 in.; and the verge plates, .025 in. The figures are given in detail in the accompanying table. How could it work with such a difference between verge plates and clearance? On a new 28-section footer the catch-bar clearance was .008 in. and misalignment of the needles was .007; of the verge plates, .011; and of the back of the catch-bar groove, .015 in. The realignment of at least one needle bar, two joints of catch-bar sections, and a few verge plates would bring the alignment inside of a .005 tolerance and a safe clearance.

After alignment, be sure the catch bar does not touch the sinkers when it comes forward after the draw and that it falls as early as possible without touching the front edge of the sinker butts. You will then find the catch bar will operate correctly and without failure.

Four important factors must be considered in planning

Large Package

ONE of the most important decisions to be made by mill management and its engineers in planning modern spinning-room equipment is that which affects the dimensions of the full bobbin, warp or filling. Four principal factors affecting the full-package size are the size of the ring, the diameter of the empty bobbin, the traverse of the ring rail, and the twist in the yarn. These four factors, interrelated as they are, must be adjusted so that the bobbin will contain the maximum amount of yarn possible. Just how these factors affect the size of the bobbin we shall attempt to explain briefly and without too much mathematics or other detail.

Ring Size and Travelers

The most important limiting factor is the traveler speed. In general, for any given spindle speed the ring size must be adjusted so that the peripheral speed of the traveler does not exceed 5,000 to 5,200 ft. per minute for medium or coarse counts. When this speed is passed, the finer numbers of travelers will either burn very quickly or fly off.

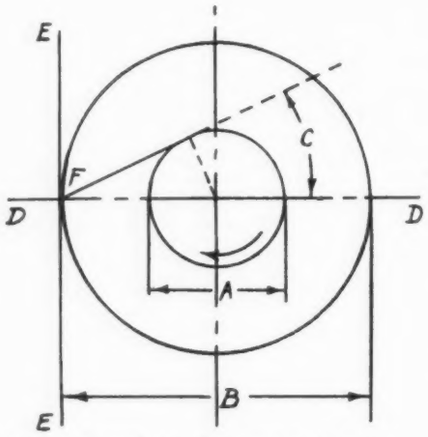


Fig. 1. Correlating Ring and Bobbin Size—Draw two concentric circles, one representing the ring diameter (B) and one the bobbin diameter (A). Draw a straight line (D) through the center of the circles and a line (E) at right angles to this line and tangent to the circle. Line (F) drawn from the point of intersection of the two straight lines tangent to the circle representing the bobbin diameter indicates the yarn passing from traveler to bobbin. The angle (C) or angle of yarn pull can easily be measured with a protractor.

The medium-weight travelers will soon become worn, causing excessive end breakage and ring wear. Thus, although the modern spindle is capable of much higher speeds than commonly run today, its speed must be held to that limit which brings the traveler speed to a reasonable figure, even at the sacrifice of full-bobbin diameter. Should the ring size cause an excessive traveler speed, in addition to the traveler damage and loss of production there will be the added disadvantage of an additional loss caused by excessive ends down due to the inability of the traveler to control the balloon properly through a wide range of variation. This latter limitation is well recognized by practical mill men and is a condition which can be demonstrated mathematically.

If we study the foregoing paragraph carefully, we immediately realize that there is another factor which has an effect on the ends down besides the traveler speed, and that is the strength of the yarn. This is because the size of the traveler, together with its speed and the diameter of the ring, determines the centrifugal force created by the traveler in its rapid revolution around the ring. This centrifugal force can be figured for each weight of traveler in terms of "foot-grains" per second. Consequently, a high-grade yarn of a given number spun from a good staple, which is well carded and well prepared, will stand a greater strain than a poor yarn of the same number. So we can readily see that the strength of the yarn must be considered when discussing the traveler speed and the strain created by it.

Bare-Bobbin Diameter

Having determined the diameter of the ring, the next important consideration is the outside diameter of the bare bobbin. Since the area between the ring and the bare bobbin determines the yarn space (and this, with the traverse, the cubical contents of the full package), the adjustment of the bare bobbin is one which requires careful thought because here a mistake in selecting the proper size can be disastrous.

If the diameter of the bare bobbin is too small, the work will run badly at the start due to tension caused by unnecessary traveler drag. On the other hand, if the diameter is made larger than

Spinning

By A. K. Landau
Saco-Lowell Shops

necessary, there is a loss of capacity which continues throughout the life of the bobbin. Experience has shown that, in general, for yarns with the regular warp twist made with a constant of 4.75 times the square root of the number, the angle *C* (Fig. 1) should not be less than 23°. When the angle is less than 23°, the resultant of the forces acting on the traveler and causing its rotation produces an excessive strain which will ultimately cause end breakage. For filling yarns or yarns with a twist constant of less than 4.75, the angle *C* should not be less than 27°. Thus, it can be seen that the correlation of these two factors, ring size and bobbin size, must be carefully accomplished to achieve good-running work with maximum yarn capacity.

In the interpretation of what has been written concerning bare-bobbin diameter, we must again consider the strength of the yarn. Just as a good strong yarn will stand a higher tension resulting from a larger run or higher speed, so will a high-grade yarn stand a higher starting drag resulting from smaller angles of pull. Again, in attempting to build up a set of specifications, the quality of the yarn must not be overlooked.

Traverse of the Yarn

Ability of the traveler to control the variations in tension created by winding the yarn on varying diameters in frames with a constant spindle speed is limited. This yarn tension varies with each position of the ring rail. As the size of the balloon varies with the distance of the traveler from the thread guide, this total distance must be regulated so that the tension in the yarn can be held within the proper limits. If the traverse is too long, the balloon with the ring rail in its lower position will be so large that the ends will either whip against the separator or against each other, causing excessive snarls, fuzziness, and breakage. If the weight of the traveler is increased to control this large balloon in the lower position, there will be so much excess weight for the upper position that again we run into excessive end breakage, traveler wear, and ring damage.

It has been found in practice that for medium-count yarns with a fixed thread board the total traverse cannot be much more than 6½ to 7 in. However, with thread boards of the traversing type this distance can be extended to a range between 7½ and 8 in. For heavier yarns, 16s and coarser, it might be possible to increase the traverse up to 7½ to 8½ in.

Another difficulty following the introduction of traverse of lengths greater than those stipulated above is the excessive tension in the yarn caused by increased air resistance and backward bulge of the large balloon. This tension can attain in value an amount equal to the total tension of the traveler drag and the normal balloon.

The twist in the yarn has a definite effect on the yarn strength and its running qualities. Thus, the production of soft yarns with their reduced strength requires a larger bare bobbin and a shorter traverse than a high-twist yarn of the same number. This is a factor which should receive careful consideration in the making of specifications for a spinning frame.

The correlation of these four factors is a task which requires practical skill and engineering experience, because any error made in establishing ring size, bobbin size, or traverse is cumulative and will affect the efficiency and economy of the spinning frame throughout its life. The proper solution of this problem at the beginning, when the frame is built, will avoid unnecessary expense at a later period should it be found necessary to change either rings or bobbins or both. An engineer, whose opinion is considered authoritative, told the writer that he thinks evenness and strength of the yarn, particularly the former, are the principal factors which determine traveler speed, spindle speed, and size of the package—because after all the yarn must stand the stress and strain incidental to spinning.

After having arrived at a decision as to the size of the package, there are other specification details which must be established. For example, the spindle blade must be of proper size and stiff enough to resist the strain of the yarn which might cause flexing of the spindle. Other factors which cannot be overlooked include the size of the tape; the whorl, which must be regulated to avoid slippage; speed irregularities, which cause the traveler to chatter; and general ability of the subsidiary parts of the frame to stand high speeds. Furthermore, the spindle should be so designed that it will not vibrate, run hot, or throw oil.

Then again there is the question of production which has an effect on our decision. Some executives for the sake of increased production would rather run at a speed which results in piecing 50 ends per thousand spindles per hour, than at a lower speed and production which might result in not over 30 ends down per thousand spindles per hour.

Thus, it can be seen that this question is very complicated and very technical. Its ramifications are innumerable and it is one of those questions for which there is no yes-and-no answer. The best bet is that the matter should be left to responsible engineers who have made this matter the subject of careful study and who are qualified to accept the responsibility of making these important decisions.

Table Showing Practical Ranges of Bobbin Diameters for Different Sizes of Rings

Size of Ring	Minimum Bobbin Dia. 21°	Conservative Bobbin Dia. 23°	Bobbin Dia. for Easy Traveler Pull 27°	Common Practice
	Col. 1	Col. 2*	Col. 3	Col. 4
1¼″	.403	.440	.511	.500
1¼″	.448	.488	.567	.563
1⅜″	.493	.537	.624	.625
1½″	.537	.586	.681	.625
1⅝″	.582	.635	.737	.750
1¾″	.627	.684	.794	.750
1⅞″	.672	.732	.851	.813
2	.717	.781	.908	.875
2⅛″	.762	.830	.965	.938
2¼″	.806	.879	1.021	1.000
2⅜″	.851	.927	1.078	1.000
2½″	.896	.977	1.135	1.062
2¾″	.986	1.074	1.248	1.125
3	1.075	1.172	1.362	1.187

* Recommended for general use.

Theme-Song Designs

Introduced as "Piracy-Proof" plan for textiles patterns

Data and sample on design based on "I'm Forever Blowing Bubbles."

A NEW textile design and merchandising plan which it is claimed will protect design against piracy and also supply a novel basis for sales promotion has been developed by the Byron G. Moon Co., Inc. The project provides for the creation of designs from copyrighted songs: it was introduced to the trade last month with the showing of three fabrics in 17 prints, the designs being inspired by various songs. These prints are being made up into children's and women's dresses, boys' wash suits, smocks, housecoats and women's pajamas; the millinery accessories group includes a number of interesting and original designs.

The story of Theme Song Designs, the name under which the plan is being promoted, has two main divisions, namely, protection of the design, and promotion of the merchandise. Brief synopses of these phases follow:

Protection of the Design. Theme Song designs have three-ply protection by means of (a) copyright of the song; (b) patent applications; and (c) trade mark used in promotion. *Copyright*—Through cooperation with the Music Publishers Protective Association, New York, the Moon company has been given exclusive rights to use copyrighted songs in creation of commercial designs; Patent Applications—Moon-Arnold, which is a partnership formed by the developer and the originator of the plan, own patent applications for creating the method of these designs and have placed these rights exclusively with the Moon company for (a) creating design where a specific song is inspiration; (b) developing a method of creating something new in basic design thus also covering use of the idea in non-textile fields; and (c) creating something new in fabric. *Trade Mark*—Use of various trademarks, including the three terms, "theme", "song" and "music".

Promotion of the merchandise. Fabrics and garments with these designs will be promoted by all trade divisions from the converter to the retailer; this promotion will include exploitation of the name and popularity of the song which inspired the particular design. In each case merchandise will be identified as Theme Song Design and also will carry a tag booklet dramatizing the story of the song and its use in the textile design. It is believed the idea will lend itself especially well to fashion shows, with musical tie-up featuring the theme songs.

The idea for theme songs designs originated with Mrs. Alta Vera Arnold, a music composer, whose previous success in perfecting a method of "musical shorthand" led her to the idea of a basic system for developing designs following the formation of musical bars in a composition. Byron G. Moon cooperated with Mrs. Arnold in putting the idea on a practical basis, and the two then executed a contract giving the Moon company exclusive rights to their patent applications. The principle is to select a song and, with the aid of an artist, develop a fabric design based on (a) the song's theme and (b) the formation of the musical notes. The artist then adapts the design to textile use. The broad possibilities of the plan are evident when it is stated that the library of the music publishers' association comprises 300,000 songs; copyrights cover these songs for 26 years with privilege of renewal for another 26 years; many are now in the renewal period.

Songs are selected by a committee made up of prominent textile and fashion authorities. Two thoughts dominate selection of songs for fabric designs: (a) "Dated" songs are undesirable as they tend to limit promotional and acceptance value; (b) preference is given to songs having established popularity through some special appeal.

The mechanics of applying the idea to textiles are as follows: Working in cooperation with converters and their customers, the Moon company develops song designs for specific textile markets, and then issues licenses to cloth manufacturers in non-competitive fields to use the designs, also issuing licenses to non-competitive garment cutters, and retailers for the carry-through of the merchandise. No designs are sold. Only one store in each city is licensed to sell a specific line of Theme Song Design garments; in each case the store is supplied with sales helps and display material stressing the Theme Song idea. All merchandise is identified to the consumer as licensed under the Theme Song Design plan, and all fabrics are Sanforized-shrunk.

Industry interest in the plan focuses on two major questions: (a) will it give true protection of design? and (b) will the design sell? Time and experience alone can give adequate answer to these questions. The struggle to end design piracy in textiles, of course, is as old almost as textile design itself. The most notable contribution to that end, so far, has been the work of the Design Registration Bureau of the National Federation of Textiles, an extended study of which bureau was published on page 89, December, 1936, TEXTILE WORLD. With respect to the market possibilities of Theme Song Design fabrics, a study of the first 17 designs is helpful as a guide. These print designs were prepared by Paul Von Eisenbarth; 11 are in cotton, six on rayon fabrics. Among the songs which gave these fabrics their name and design are: "I'm Forever Blowing Bubbles," "Swing High, Swing Low," "Oh, Where Is My Little Dog Gone" and "Memories."

Converters offering these designs are Arthur Bier & Co. and W. E. McKay & Co., and the fabrics were made up into garments by Wedgwood Sportswear Co., Wee Tog Mfg. Co., M. C. Schrank & Co., Borgenicht Bros., H. Bomze & Bro., Heller Co., Lady Jane Negligee Corp., Alexander Doll Co., and Glomar Hat Corp. While certain of the designs such as "Last Rose of Summer," and "Daisy, Daisy," seem rather static, others among them, notably "Kashmiri Song" and "Ramona" for adults, and the juvenile group including "Swing High, Swing Low" and "Little Dog," are both original and pleasing. Indeed these would seem to have very real appeal when made up into ready-to-wear; assuredly they have novelty interest, which effectively exploited in promotion could make for good sales.

Loomfixers' Manual

WOOL SECTION CHAPTER I

By Benjamin F. Hayes

This first chapter of the Wool Section introductory to Mr. Hayes' main discussion, which will follow in later issues, is applicable to all branches of loomfixing — cotton, silk, and rayon, as well as woolen and worsted. Many later chapters of all Sections will likewise have general application, and therefore readers will find it beneficial to follow the entire Loomfixers' Manual, whether or not the current discussion is directed primarily to their field.

Chapter I of the Cotton Section, which appeared in the August issue, was devoted to loom construction. Any reader who, for one reason or another, missed that chapter may secure another copy without charge, as long as the supply lasts, by writing* TEXTILE WORLD. *Chapter II of the Cotton Section, dealing with take-up motions, will begin next month.

Qualifications of a Loomfixer

IN MANY respects loomfixing offers the best position in the mill. A loomfixer is to a loom what the doctor is to his patient. His is interesting work with plenty of variety, and it calls for all a man has in the way of mechanical ability and general intelligence.

On the other hand, it demands a wide range of qualifications in a man—more than most managements realize, as evidenced by their often careless selection of loomfixers. These qualifications run the gamut from a knowledge of mechanics to an understanding of psychology. I am listing them below:

1. *Mechanical ability.* A considerable amount of mechanical ability comes from experience, but it appears that one has to be born with some of it. There are boys not over six years old who take to mechanics like a duck to water, and there are grown men who cannot diagnose the ailments of a common wheelbarrow.

2. *Intelligence.* The loomfixer must be able to reason out solutions to the problems he encounters, even when the evidence he has to work on is slim.

3. *Ingenuity.* He must be able to devise original methods of overcoming difficulties which are new to him.

4. *Inquisitiveness.* He must be curious as to why things work in a certain way and why the loom builder has applied this or that gadget to the loom, why this or that part is shaped just the way it is, and so on. He must not be afraid to ask questions of anybody, whether overseers or other loomfixers. He must be an avid reader of his technical magazine, willing to take it out of the mill and study it in the quiet of his home.

5. *Foresight.* He must have the vision to look ahead, anticipating repairs, keeping his supplies sufficiently stocked and not over-stocked, and planning repairs that will last. Where temporary repairs are necessary, he must foresee how soon a permanent repair will be required and make it ahead of time.

6. *Economy.* The loomfixer must be a little Scotch in the use of his supplies, and not wasteful of the firm's money. He should keep supply records, date his picker sticks, and find out why certain looms are demanding more supplies than others in order that he may correct the condition. He must not, however, practice false economy by using supplies that are worn out or recommending or approving the purchase of cheap supplies that won't last.

7. *Conscientiousness.* He must have an inherent desire to do everything in the best way, consistent with the time available.

8. *Persistency.* He must not become discouraged over difficult problems, but must stick to a job until he has it licked. He must, if necessary, return again and again to the same loom to work over the same defect.

9. *Cool-headedness.* He must not be easily exasperated, but must retain his ability to think clearly when confronted with the frequent "cussedness of the inanimate."

10. *Open-mindedness.* He must be willing to be told and to accept suggestions from overseers, second-hands, other loomfixers, and even (in some cases) weavers. Most loomfixers have had more experience with certain problems than have others and are therefore, in a sense, specialists. A specialist's advice can be very useful in tackling special problems.

11. *Cooperativeness.* Just as he should be willing to accept information or advice, he should be willing to give it. His reward will be the receipt of assistance in return, and he will make friends who may be of help to him later in life. Personally I have received numerous favors from young fixers whom I helped get on their feet. One even made it possible for me to secure a badly needed job years after I had been of help to him.

12. *Agreeable disposition.* A fixer has got to get along amiably with the weavers. If they are afraid of him, they will not call him many times when he is needed. A bossy, bulldozing manner seriously injures the efficiency of the weave room. It goes without saying, of course, that the same attitude toward overseers, second-hands, and other loomfixers is also desirable—particularly in the latter case if cooperation is to be secured. A loomfixer is naturally open to abuse from other workers, particularly weavers (I have seen a woman weaver, in a rage, spit on a fixer); and on such occasions his equanimity can be severely shaken—but the more he keeps his temper the better for all concerned.

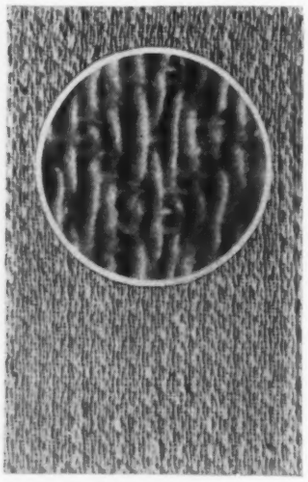
13. *Understanding of psychology.* This comes into play in his dealings with everybody, but it is of particular importance when he wishes to suggest improvements to his overseer. The latter is inclined to think that such a suggestion is a criticism and a reflection on his own ability. It is always advisable in such cases first to consult with the overseer and make sure that he understands the problem and has a chance to think about it. Once he recognizes the difficulty, sees the need for improvement, and has tried to devise a solution of his own, he is usually prepared to receive the suggestion offered by the fixer. The overseer should always be consulted before some radical change is made in the loom.

Staple Cotton Fabrics

By John Hoye

Fabric Technician with
W. Harris Thurston, New York.

Curtain madras, diaper cloth, and rice cloth are discussed in the twenty-first installment of Mr. Hoye's series of articles on staple cotton fabrics which began in January, 1936



Iselin-Jefferson Co.

Bird's-Eye Diaper Cloth—29", 56x48, 5.40 yd.

Diaper Cloth

BIRD'S-EYE DIAPER CLOTH is a carded cloth woven with a diamond or bird's-eye design. The warp yarns used are finer than the filling yarns. The coarse filling yarns make the fabric very absorbent. It is usually woven with six harnesses.

Finishes used: Bleached and pure finished—no starch, very soft.

Uses: Diapers, towels, etc.

Widths: 19 to 32 in.

Warp yarns: 23s to 29s.

Filling yarn: 12s to 17s.

Examples of bird's-eye diaper cloth:

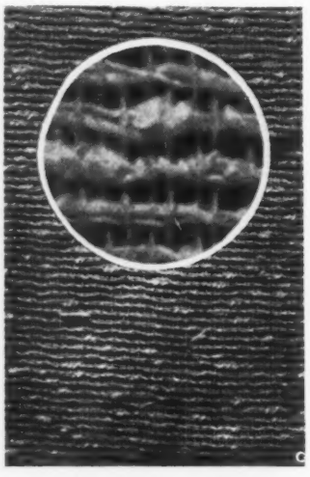
29" 64x64 4.80
32" 64x64 4.20
32" 56x44 4.75
29" 56x44 5.25

Another type of diaper cloth has a flannel finish and is made from various weights of sheetings with soft-twist filling. These fabrics are napped and bleached, producing a soft, absorbent finish.

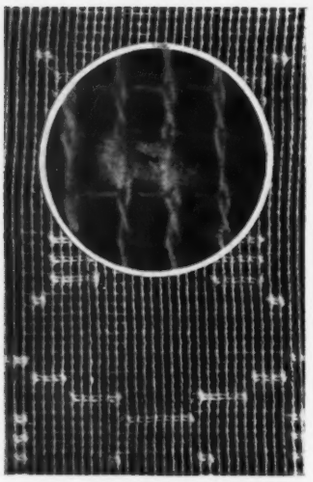
Curtain Madras

CURTAIN MADRAS, also known as *curtain grenadine,* usually consists of an all-over heavy and prominent woven design on an open-weave leno or gauze-ground fabric, producing a lacy effect. The design usually is of dobby- or jacquard-woven figures, or can have cushion dots similar to the dotted swiss. Strong wide-tape selvages of ply yarns are used. These are necessary because of stretching or framing in finishing and later in laundering.

Extra picks of roving or yarn are used to form the decorative design. The repeats of the design are fairly well spread out on the face of the cloth, and in between the repeats the roving floats along the back of the cloth. After weaving, these loose floats are sheared or clipped off closely; also, in finishing, the back of the cloth is usually singed so that the clipped ends are left as short as possible. The ground fabric and the roving or extra filling are often self-color (gray), or piece dyed in ecru, etc. White and colored rovings are also used. The ground filling can be yarn dyed in curtain or drapery colors of ecru, tan, blue, gold, etc. If the ground warp and extra roving, are unbleached (gray), the fabric is then converted by bleaching.



Rice Cloth (Finished)—36", 42x22, 5.00 yd.



Curtain Madras — Clipped dobby-woven design. White warp and colored filling; extra mercerized white filling on leno-woven ground. 40", 40x20,—ground; 40", 40x40—overall

The ground fabric when made in the plain gauze weave (without decoration) is called *marquisette.* Curtain madras is made in various qualities, both carded and combed. The finer qualities have more meshes (higher construction) to the square inch, and the yarns used are usually two-ply combed and gassed. In addition, they sometimes are mercerized. Another type of curtain madras, formerly used in large quantities, is a lace fabric of net or mesh with large embroidery effects.

Finishes used: Plain or mercerized.

Uses: Curtains, etc.

Yarns: 30s to 40s carded; 50s, 60s, 80s, 100/2 combed.

Extra filling—22s, 16s, 10s.

Examples of curtain madras:

40" 40x18—ground carded.
40" 40x38—overall carded.
40" 54x60—overall combed.
40" 54x44—ground combed.

Rice Cloth

RICE CLOTH is a specialty fabric, at one time largely used, but now made only on contract. It has a "rice" or "seed" effect formed by a novelty filling yarn similar to a ratiné yarn. This filling is a two-ply yarn. In the twisting the singles yarns are fed intermittently at different speeds so that one of the yarns bunches up to form loops or knots which give the cloth when woven its rice or seed effect. A loose twist is employed in the plying.

Finishes used: Usually mercerized.

Uses in finished state: Women's summer dress wear.

Warp yarns: 36s.

Filling yarns: 18/2 seed yarn.

Example of rice cloth: 36", 42x22, 5.00 yd.

Recent investigations disclose results obtained with various types of

Mothproofing Compounds

By C. N. Sprankle and Ruth Slabaugh

Technical Laboratories, Sears, Roebuck & Co.

PREVIOUS articles in TEXTILE WORLD have described the life cycle of the clothes moth, called attention to the enormous amount of damage caused by moths, listed the properties which are requisite in a satisfactory mothproofing compound, and discussed the mothproofing methods now employed in textile mills. The present article gives the results of an investigation of a group of fabrics treated with various types of mothproofing compounds and subjected to certain conditions met with in consumer use.

THERE IS a definite need for an entirely satisfactory mothproofing chemical, particularly for all those wool goods which are stored during certain periods of the year, such as wool garments and blankets. This need is also applicable to overstuffed furniture and other such bulky items which, when once infested, can only be treated by fumigation in specially constructed rooms. A preliminary survey of the literature on mothproofing compounds gave such inconclusive or contradictory results that it was deemed advisable to instigate a comprehensive study of all the better-recommended compounds in order to determine their actual practical value when applied to various wool articles sold at retail.

For fabrics which are both washed and dry-cleaned, a suitable chemical for mothproofing should be resistant to removal by either treatment. For fabrics which are only dry-cleaned, the chemical need only be resistant to removal by dry-cleaning and not necessarily resistant to removal by washing. For articles, such as rug cushions or pads, which are neither washed nor dry-cleaned, the chemical need not be resistant to removal by either method.

The following types of compounds were selected for study: (1) silicofluorides (2) cinchona alkaloids (3) rotenone (4) Eulans, and (5) arsenites.

Two commercial samples of the silicofluoride type of mothproofing compound were used in the study. In addition, a solution of sodium aluminum silicofluoride was compounded in the laboratory. The cinchona alkaloid type was a commercial compound. The rotenone solution was prepared in the laboratory by adding 1.5 grams of rotenone to 1 qt. of acetone. Eulans is the brand name for a series of patented products of various chemical composition; commercial samples of two recent compounds of this range, Eulan NK and Eulan CN, were obtained for use in these tests. The arsenite compound was a commercial product.

For wool materials, we chose a light-green wool flannel and a heavier, dark-blue wool coating. These materials were cut into sections approximately 8x10 in. in size, and one section of each was treated with each of the above-mentioned types of compounds. With the exception of the Eulans, the compounds were all applied by 5-min. immersion of the fabric in the solutions, squeezing out the excess liquor, and hanging up the samples to dry. In applying Eulan CN, the temperature of the solution was raised to 130° F., the materials were immersed, and the temperature was gradually raised to 175° F., where it was maintained for 20 min. The excess solution was squeezed out and the materials were hung up to dry.

Results of Test

The three silicofluorides are effective as initially applied to the fabrics, are not removed by dry-cleaning solvents and are not deteriorated by exposure to light; however, they are removed by washing.

Cinchona alkaloids and rotenone are effective as initially applied to the fabrics, are not removed by washing, but are removed by dry-cleaning solvents and are deteriorated by exposure to light.

Eulan CN and Eulan NK are effective as initially applied to the fabrics, are not removed by washing even to ten times, are not removed by dry-cleaning solvents, and are not deteriorated by exposure to light.*

Arsenites resemble the silicofluorides in their mothproofing properties, but are not recommended by the American Medical Association and by the U. S. Department of Agriculture, because of their extreme toxicity.

TEST METHODS

The treated fabrics were cut into sections approximately 2 in. square and accurately labeled. Samples of each fabric treated by each solution were then subjected to the following treatments: (1) Samples of each treated fabric were washed three times in the Launderometer in neutral soap at 105° F. After each washing, which lasted 10 min., they were thoroughly rinsed and dried. In several cases where more definite results were desired, the samples were washed as many as ten times. (2) Samples of each treated fabric were dry-cleaned and rinsed three times in Stoddard solvent—thoroughly drying after each cleaning. (3) Samples of the variously treated fabrics were exposed in the Fade-ometer for a period of 90 hrs.

Each sample to be tested was cut into a circle approximately 1½ in. in diameter and placed in a Petri dish. A loosely woven cloth was tied securely over the top to provide air and prevent the larvae from escaping. Fifteen medium size larvae were used in each dish. The dishes were kept in a dark cabinet at room conditions and were observed every week or ten days. On all those dishes where the larvae died within six weeks, the dishes were reinfested and an additional six-weeks' test was run in order to verify the results. The results were based on the following factors: (1) dead larvae; and (2) amount of damage judged by amount of excrement.

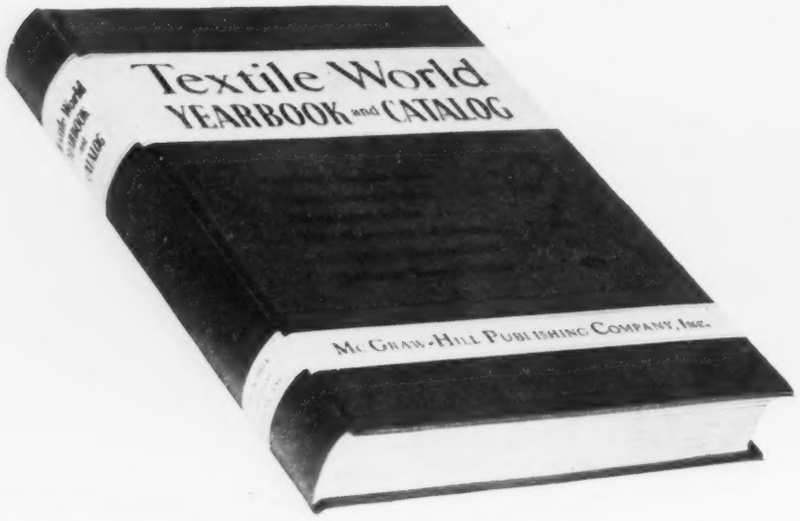
Control checks were run on the material used, in order to be certain that they were not in themselves, inherently mothproof. Both cloth materials were badly damaged by the larvae. The results of the test are shown in the accompanying chart.

* NOTE: After these tests were completed, the authors were informed that the Eulans are removed by dry-cleaning at 140° F. with carbon tetrachloride (Zoric system). Subsequently swatches of a blanket commercially treated with Eulan CN were subjected to a series of dry-cleaning processes with carbon tetrachloride and were then subjected to larvae infestation. At the end of a month most of the larvae were dead, little excrement was evident, and no more damage than the cutting of some loose fibers to spin their tunnels or cocoons was apparent.

RESULTS OF LARVAE INFESTATION OF TREATED FABRICS

Fabrics Treated With	As Treated	After Washings: 3 Washings	After Washings: 10 Washings	After Dry Cleaning 3 Cleanings	Exposure to Fade-ometer 90 Hours
Silicofluoride No. 1	No damage	Damaged	No test	No damage	No damage
Silicofluoride No. 2	No damage	Damaged	No test	No damage	No damage
Sodium Aluminum Silicofluoride	No damage	Damaged	No test	No damage	No damage
Cinchona Alkaloids	No damage	No damage	No test	Damaged	Damaged
Rotenone	No damage	No damage	No test	Damaged	Damaged
Eulan CN	No damage	No damage	No damage	No damage	No damage
Eulan NK	No damage	No damage	No damage	No damage	No damage
Arsenite	No damage	Damaged	No test	No damage	No damage

The Yearbook Is Out



Answers multitude of textile questions

Offers complete "Buyers' Guide"

THE *Textile World Yearbook* has begun its third year as a companion of the *Textile World Catalog* now celebrating its 15th birthday. The combination issued this month results in a well-balanced reference book of year-round value to the industry. The editors have collected tables, formulae, charts, nomographs, and other basic information from far flung sources and brought them together for easy reference in one volume. This material supplements the catalog insertions of leading suppliers to the industry. The book concludes with a complete buyers' guide, listing makers of all products used in the field whether or not these makers are represented in the catalog itself. They are listed under 2,500 product headings and also alphabetically.

The Yearbook content is divided into eight sections. The first comprises an outline review of all the new machinery items published in TEXTILE WORLD during the latter part of 1936 and the first part of 1937, and a list of new chemicals and dyes put on the market during the same time.

The second section covers mill reference data for all branches of industry, running to 47 pages and listing 132 different items. The index to this section shows its breadth of coverage:

GENERAL — Yarn-Number Conversion Table; Reed Chart; Diameters of Yarn; Recommended Illumination for Textile Mills; English-Metric Equivalents; Yarn Sizing Constants; Resulting Counts When Combining Yarns; Sag in Mill Regain; Textile Regain Data; Count and Weight Corrections for Regain; Strength Corrections for Regain; Regain Under Mill Conditions; How to Tie the Weaver's Knot; Cotton Regains; Wool Regains; Psychometric Relative Humidity; Table Showing Cost of Steam per 1,000-lb.; Ring Frame Production on Delivery Roll r.p.m.; Ring Frame Production on Spindle Speed; For Two Yarn Numbers Gives Combined Size; Net Yarn Weight Factors; Recommended Humidities; Yarn Count and Production Formulas; Directions of Twist; Loom Lubrication Chart; Correction of Yarn Strength to 7 per cent Regain; Correction of Fabric Strength to 7 per cent Regain; Yards-per-Pound to Ounces-per-Square-Yard; Moisture Content to Moisture Regain; Degrees Centigrade to Degrees Fahrenheit; Specific Gravity to Twaddle or Baume; Equivalent Atmospheric Conditions.

COTTON—Yarn Breaking Strength Charts; Roving Twist Table; Cotton Roving Twist Chart; Twist and Single-Cotton-Yarn Contraction; Twist and Ply-Cotton-Yarn Contraction; Strength and Yarn Count; Twists for Yarns of Maximum Strength; Power Required for Cotton Machinery; Finding the Twist; Spinning Capacity of Texas Cotton; Cotton-Warp Sizing; Cotton-Spinning Organizations; Correction Factors for Regain; Chart for Cotton Cloth Analysis; Problems; Table of Front-Roll Speeds.

WOOL—Clean Wool Value; Ounce Top, Dram, Grain, Hank Equivalents; Comparison of Card Wire Numbers; Horsepower, Speed apd Weight; Worsted Cap Spinning Production; Wool Quality Numbers vs. Worsted Yarn Counts; For Setting Up Weave-Room Indirect Help; For Carding Noils; Comparative Grades of Wool.

RAYON—Effect of Twist on Spun Rayon Yarns; Effect of Regain on Viscose Yarn Strength; Comparative Rayon Yarn Table; Denier and Filament of American Rayon Yarns; Moisture Absorption at 25° C. of Yarns; Moisture Regain for Acetate; Moisture Regain for Viscose; Stretch vs. Tension; Wet Recovery; Recovery of Stretch; Effects of Twist on Acetate Yarns; Effects of Twist on Properties of Rayon; Effects of Humidity on Synthetics; Rayon Staple Organization; American Rayon Producers; Viscose Contraction and Yardage Chart.

SILK—Loom Pattern Chains for Foundation Weaves; Take-Up of Oil from Silk Soaking Solution; Silk Thread Constructions Used in Hosiery; Classification of Raw Silk; Influence of Twist on Silk Hosiery Yarn.

KNITTING—How to "Gauge" a Latch Needle; Parts of a Latch Knitting Needle; Latch Needle Hooks; Circular Hosiery Yarns; Looper Points for Circular Hosiery; Latch Needle Gauge and Needles per Inch; Average Yarn Sizes for Knitting Machines; Data on Latch Needle Ribbers; Production from Rib Machines; Standard for Measuring Hosiery; Strength of Knitted Fabrics; Basis for Grading Hosiery; Cut Presser Diameters.

PROCESSING—Organic Solvents and Their Properties; Preparation of Soda Bleach Liquors; Mixing Chart for Caustic Solutions; Fireproofing Textiles; Mothproofing Compounds; Printing Machines, Motors and Speeds; Effect of Cooking on Starch Viscosity; Effect of Alkalis, Chemicals on Wool; Changes in Peroxide During Boil; Selection of Mildew-Proofing Agent; Formulas for Dyeing Hosiery; Pyroxylin Coatings; Formulas for Finishing Threads; Wool-like Finish on Spun Rayons; Silk Weighting Table.

The third section lists 23 useful chemical tests of value to the textile man, as follows:

Quick Tests for Textile Fibers; Identification by Ultra-Violet Light; Shrinkage Tests; Control of Mercerizing Liquors; Sulphuric Acid in Wool; Estimation of Water in Wool; Determination of Acid in Dyed Wool; Identification of Rayon; Determination of Moisture and Oil in Rayon; Take-Up Value of Soaking Solutions; Analysis of Weighted Silk; Measurement of pH; Comparison of Desizing Agents; Determination of Penetration of Gelatin Size; Analysis of Hydrogen Peroxide; Rapid Test for Silica in Peroxide Solutions; Sodium Formaldehyde Sulphoxylate Evaluation; Determination of Starch Viscosity; Distinction of Sulphonated Oil and Liquid Soap; Evaluation of Wetting Agents; Analysis of Mixed Textiles; Determination of Alkalinity of Boil-off Liquors; Fatty Content of Soaps.

The fourth section covers all known textile standards adopted by official bodies, with ready reference to names and addresses of sponsoring organizations of which 78 are listed.

The fifth section presents brief economic statistics for principal branches of the industry, including typical prices on fiber, yarn and fabric, fiber consumption, machinery activity, etc.; also TEXTILE WORLD's price index numbers by months for six years and annual figures on the industry's activity and textile machinery sales, 1929 to date.

The sixth section is an index of leading trade associations in the industry, with names of the executive in charge of each office and his address. Despite the omission of numerous fringe associations there are 54 given.

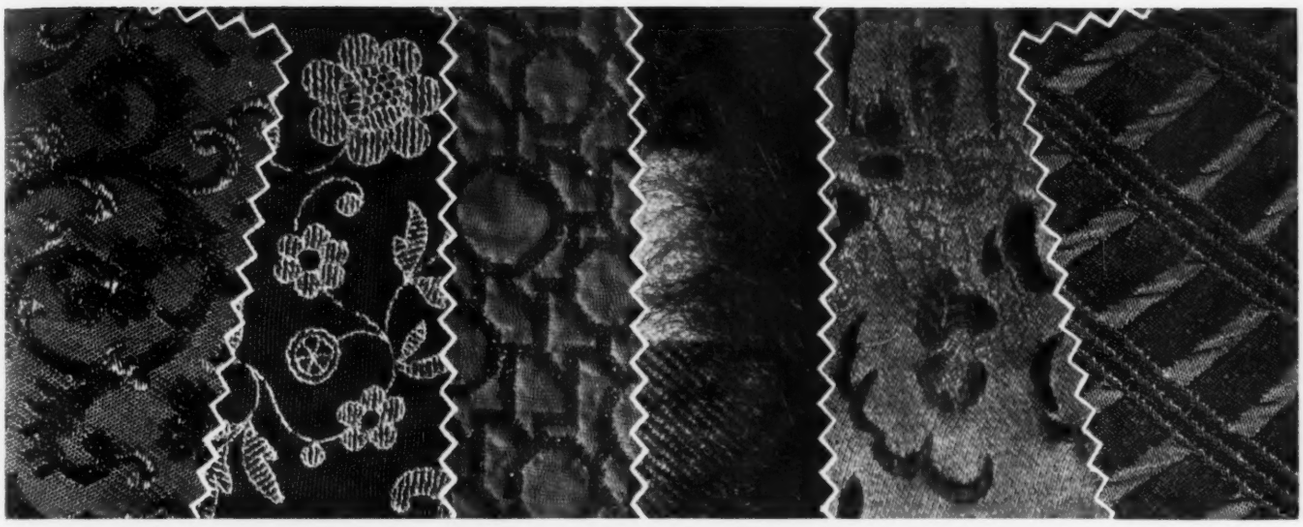
The seventh section is a bibliography, listing under 18 detailed headings nearly 700 books. Whether in or out of print is clearly marked. There is an accompanying directory of names and addresses of 160 publishers and agents.

The eighth section of the Yearbook comprises an index to the 13 issues of TEXTILE WORLD published during 1936 with an alphabetical listing of authors and their articles in the same period.

Catalog section presents information, inserted by leading purveyors to our field, to aid buyers of their products to locate what they want most quickly and effectively. These pages are carefully classified and indexed. Catalogs of over 200 concerns are grouped under 10 main headings.

The unique "Buyers' Guide," listing *all* known makers of textile devices and materials, about 1,700 of them, opens to the user of this book the complete market-place for textile supplies.

A copy of *Textile World Yearbook* is sent free to mills listed in *Official American Textile Directory* and additional copies for any of these mills is charged at $2.50 per copy if ordered on company letterhead. To all others it is sold at $5.00 per copy.



Dullness and luster in one fabric (A. Godde Bedin) | *Jacquard satin with Renaissance figures (Raymond Castelain)* | *Plaid accented with fur (E. Meyer)* | *Cloqué outlined with brilliant lamé (F. Carlin)* | *Gold-printed marquisette in new style (F. Carlin)* | *Brocade in gold-tint rayon outlined in lamé (Chatillon Mouly Roussel)*

Richness Is Paris Keynote

Jacquards, metals, "skin" textures feature winter offerings

By Betty Hirschberg

Paris, France

STUDY of the Paris winter ranges, recently opened, reveals a remarkable tendency toward jacquard-woven designs. Effects in the character of damassés, faconnes, broches, matelasses are prevailing. Jacquard patterns are giving new richness to materials, induced perhaps by the current Paris Exhibition.

Chatillon Mouly Roussel offers damask designed in the style of Louis XV and Venetian brocade of a Renaissance style. Satins, failles, ottomans, heavy and stiff silks are in favor. Carlin shows jacquard designs representing scenes from the Middle Ages with gentlewomen, knights, castles, escutcheons in gold. Contrasts of shiny and dull effects are shown. For example a mossy crepon of Carlin has faconne-effects, brilliant on one side over dull background and vice versa.

A lamé fashion of great breadth has been forecast for next winter. Carlin calls one of them "drap d'or" (gold-cloth). Combination of Albene yarn and metal thread by Chatillon Mouly Roussel produces original bright and dull effects. Another unusual fancy is the "Lamé Patrick" of Chatillon Mouly Roussel. On the background of black, white, orange or blue rayon the Prince of Wales design in silver has been incorporated. Other fabrics incorporate gold or silver threads in a wide range of effects.

Another type of lamés are the metal-printed fabrics. According to a new process, the surface of sheer silks is printed with metal simulating embroidery. Carlin uses delicate marquisettes as background for ornaments in gold print. Carlin's "Dirndl-Lamé," with metal and lacquer designs in brightly colored pastoral motifs is reminiscent of village festival garb, Alpine peasant-couples, swaying in their national dances. Church-window paintings, images of the mythology, temples, etc., serve to inspire another printed lamé of Carlin.

Fabric Versatility

Typical for the new materials is a union of numerous decorative effects in one fabric. The collection of Raymond Castelain contains a double-face, one side velours, other of metal yarn.

For plain materials high-twist crepe yarns, dense, mossy and brilliant surfaces are in favor. Colors range from those of vehement and passionate ardor, to those emanating sublime serenity and peace.

Silks, velours, jerseys, wool are finished in surface effects resembling flesh or skin. Chatillon Mouly Roussel has created a velour, called "Peau" of silk and Rhodia. Silks or jerseys have the touch of a peach. A. Godde Bedin has brought out an interesting rayon "Crepe Elephant," the surface imitating the skin of that animal. Another novelty is Peau de Poulain (foal-skin). In wool fabrics velours de laine, duvetine and zibeline have been chosen as leaders. The zibelines have a long, hairy, lustrous surface. Mohair serves as an effect yarn on a tartan material, like a fur-trimming. Woven fur-imitations will also find popularity.

E. Meyer features rust, yellow, brown, chestnut, fox-red, reddish-brown, blond. One group of fancy woolens, whatever their color or design, contains always a tint of rust color. To go with these fabrics, Meyer has made a single, plain wool in the rust shade, a kind of paternal head of this wool-family, whose members have all a certain resemblance to it.

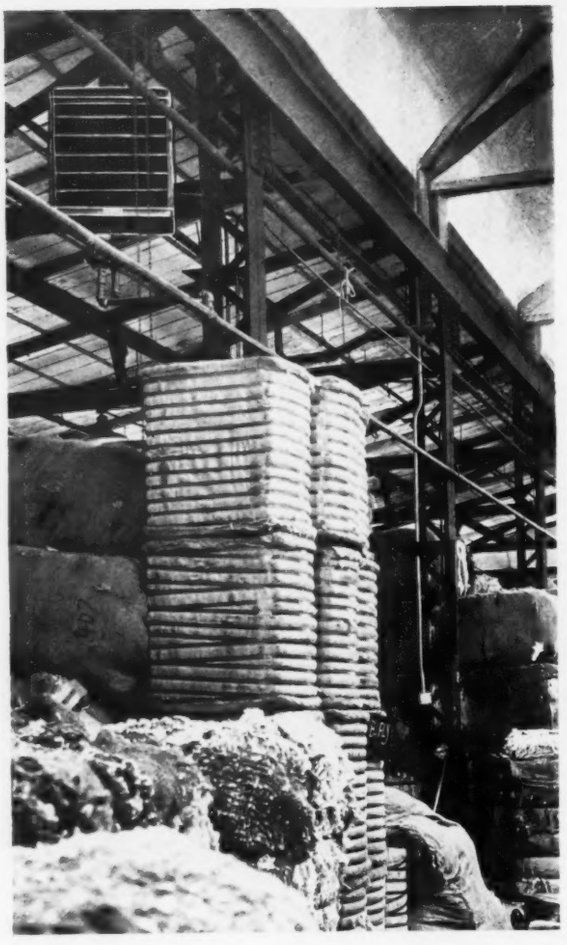
Patou has chosen as winter colors "Rouge Florentin" and "Vert Armure" and is using both for daytime, street, and evening wear. The red is a warm and deep shade of dark rose. The green has a grayish glint, the unreal color of leaves at night illuminated by incandescent light. Black remains Patou's great color, particularly for cocktail-tailor-mades and for his slim, long, draped lines. In the collection of Marcel Rochas, black is always accompanied by two or three bright or pale colors. The American couturier Mainbocher, who furnished the whole trousseau of the Duchess of Windsor, is using four colors: Chinese Black, Damask Red, Georgian Green and Bracken Browns.

Unit Heaters

Proving adaptable to textile mills regardless of size or type of plant

By Fred Merish

Recently we asked a number of mill men in various branches of the industry whether unit heaters were giving satisfactory service. Of the 61 who replied, 59 said, "Yes"; one said, "No"; one said, "What is a unit heater?" The versatility of this type of equipment is shown by the answer made by the same men to a question as to what parts of their mill are best served by unit heaters. In the order of their frequency, replies were as follows: all parts, weave shed, dyehouse, receiving and shipping department, cold north ends, wash room, where moisture collects in cold weather, show room, open sections, single-floor mill, where ventilation in summer and heating in winter are required, passages, boiler house, work rooms, store house, continuous washers, spinning room, inspecting department.



Unit heaters are effective in textile mill storage rooms

IN A recent survey of textile mills the writer found that the unit heater is becoming increasingly popular. Obsolete pipe coils common to many textile mills are being replaced with modern unit heating, either suspension or floor diffusing units, to assure uniform temperatures. This even temperature is not only desirable on account of the product turned out by a textile mill; but the morale, health, and productivity of employees are improved.

Installed about 12 ft. above the floor, the unit heater of the suspension type takes up no valuable floor space, which is a big advantage in a textile mill. Its flexibility of placement makes this type of unit heater adaptable to any part of the mill, regardless of size or structural design. The larger the interior to be heated, the more units are installed. Each unit has a heating element with a fan behind it, much like the assembly of radiator and fan on an automobile. The fan blows the air through the heating element, which contains a network of tubes filled with hot water or steam. By means of the fan, this heat is circulated throughout the interior. One unit heater will throw a cone of heated air about 60 ft.

Simplicity of Installation

Unit heaters of the suspension type are spotted around the mill much the same way lights are placed to get the greatest efficiency. They may be hooked into the steam or hot-water line anywhere. A special unit is provided for certain locations, so that the lint flying around can pass through the unit without clogging the condenser.

Many textile mills are using unit heaters in the dyehouse, either suspension or floor types. One superintendent told the writer that, until a unit heater was installed, workers in the dyehouse could hardly see during cold weather. The vapor rising from the dye vats not only made it hard to see, but caused condensation on the walls, resulting in constant drippage and damp working conditions. Conditions were particularly disagreeable when snow lay on the roof. One unit heater eliminates fog and drippage in this dyehouse.

In another mill the author found two unit heaters in the dyehouse, equivalent to about 4,000 ft. of radiation, enough to heat an entire floor. One superintendent reported the consumption of 1½ tons of hard coal daily; another, ⅓ ton an hour. It takes heating power to eliminate fog and condensation, but this expense is low compared to the benefits of improved production, better employee health and morale, prevention of spotted goods, fewer redyes, etc.

A floor-type unit heater is in use in one carpet mill to dry small swatches of rugs, which are hung in front of the diffusing unit circulating the air. Incidentally, unit heaters often prove helpful where industrial drying is done.

Two unit heaters are being used to excellent advantage in one plant for drying silk, a heater being located at each end of the frame, which is provided with a housing. In other mills unit heaters are operated over nights and week-ends to keep water or sprinkler pipes from freezing. One or two units can handle an area of 30,000 sq.ft. A temperature of 50° F. is sufficient.

Prevents Stratification

In many mills using obsolete heating systems temperatures may differ 20° or more, the higher temperatures being along the outside walls where the heating equipment is usually placed, the center of the building being much colder. Again, in many mills there is a variation of more than 1° per ft. of elevation. Warm air rises, and instead of being equally distributed throughout, with an obsolete system, the heat hugs the roof. The unit heating system breaks up this unhealthy and costly stratification of warm air around the roof, keeping the air in motion at all times, so that all parts of the interior are evenly and comfortably heated. Obviously, employees working in an adequate, even temperature can do more accurate work and give greater satisfaction than workers in temperatures that fluctuate widely.

Unit heaters are being used in some mills to eliminate drafts. Drafts create discomfort, distract workers from their tasks, and endanger health. Drafts are costly intruders. By strategic placement around passageways, doors, and large window areas, the unit heater eliminates the draft, usually by blowing warm air across the draft source. Then too, the elimination of drafts and cold spots and maintenance of even heat cut fuel costs. Unit heaters save from 15 to 35% in fuel costs, according to reports given to the writer. Being thermostatically controlled, a unit heater shuts off when the temperature reaches the desired point and does not demand fuel again until the temperature falls below that point.

Fast Turnover

High ceilings and great wall exposures in textile mills make it difficult at times to get back to working temperature after shutdowns. In the early morning, employees often work in unhealthy, sub-normal temperatures, because the buildings have not warmed up enough. Unit heating corrects this condition. The fan in the unit forces the air through the heating element and down to the working level within a few seconds after the heat is turned on. Tests have shown that the entire cubical air content of an interior is turned over six times in 1½ hr. with unit heating. The cubical air content turns over once an hour with older types of industrial heat. This fast turnover of warm air means that an interior is evenly, comfortably, and healthfully heated in one-quarter the time it takes obsolete systems to heat.

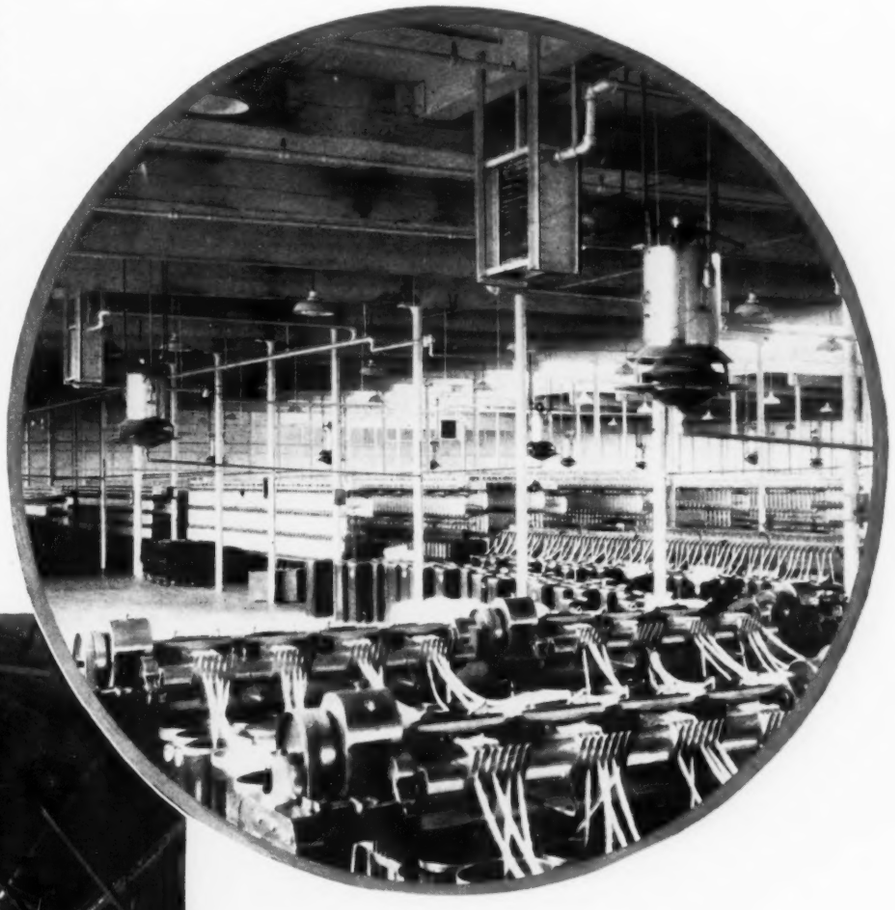
Installation of unit heaters is simple and inexpensive. Repairs are far lower than on obsolete types of heating systems. The flexibility of placement makes the unit heater adaptable to any mill, regardless of size or type. Units may be installed singly or in groups, according to the requirements of the mill.

Territorial location makes no difference in the installation technique. Unit heaters operate the same in all sections of the country. In warmer climates the unit heater capacities and circulations are reduced up to 25%. For good heat distribution, there should be at least three air changes an hour.

Summer Cooling

The unit heater may be used for summer cooling by operating the fan in the unit. This decreases the temperature and produces a substantial step-up in production on sweltering days. No one can work his best when he is dripping perspiration. It costs about $1 per month per unit to operate the fan, which usually is from ⅛ to ½ hp. Tests have shown that workers do 20% more work and do it better in comfortable temperatures, winter and summer. Sick leaves, because of colds and other respiratory ailments due to uncomfortable temperatures, are minimized with proper heating and cooling facilities.

The industrial heating engineer today considers modern mill heating a major production asset. He is responsible for the cost of heating; likewise for its efficiency. Modern unit heaters, properly installed, will contribute largely toward bringing about maximum production, minimizing overhead, maintaining a high standard of workmanship, and keeping employees' health and morale at a high peak.



Unit heaters suspended from ceiling in large cotton mill

Unit heaters arranged on side wall in a textile plant

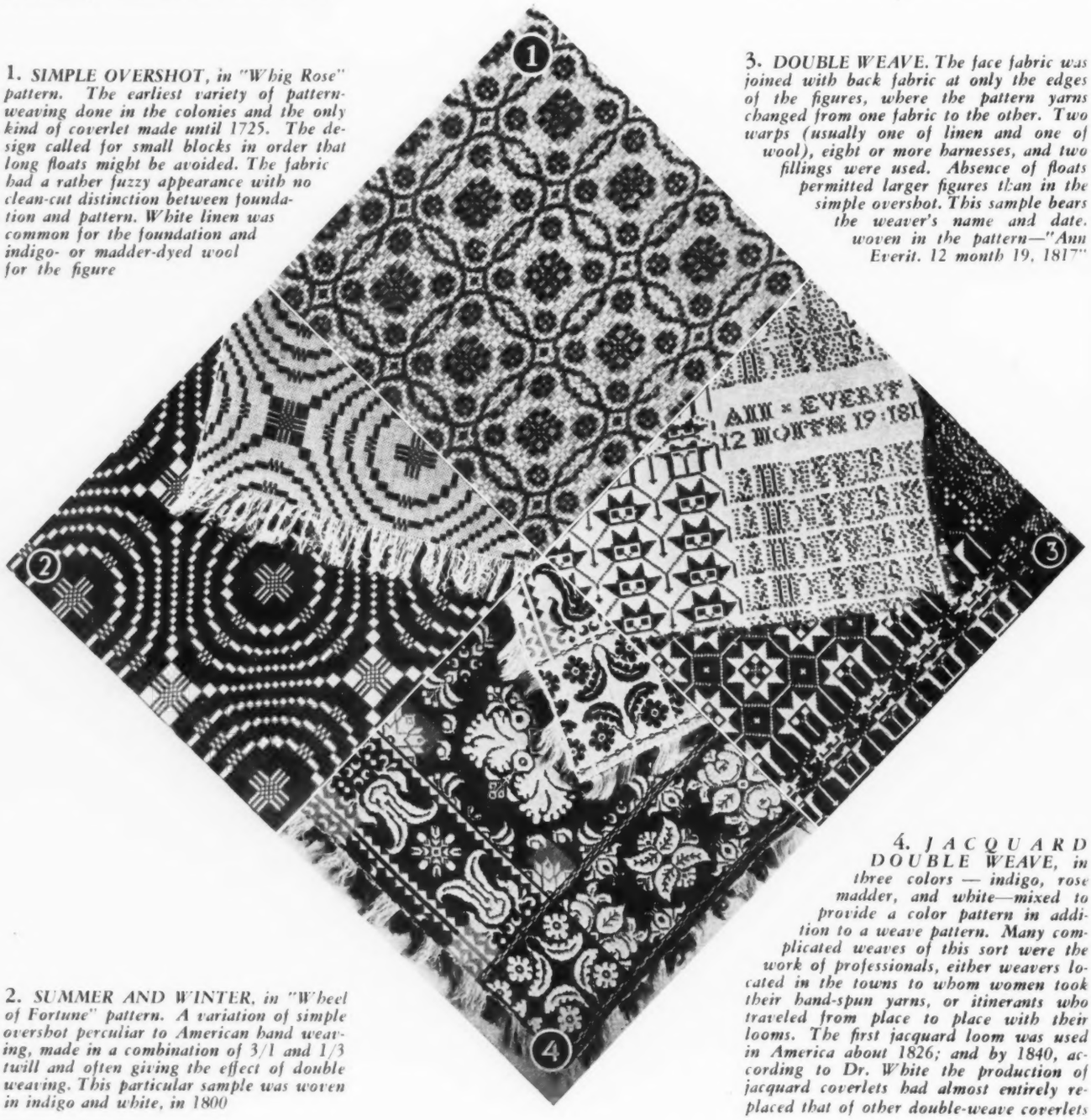
Coverlet History

Told by part of "Fashions in Fabrics" exhibit at Newark, N. J., Museum

AN EXHIBITION tracing the history of textile design and manufacture from primitive times to the end of the nineteenth century is being held at Newark Museum, Newark, N. J. Fabrics of many kinds from many lands are shown, together with implements and labels which illustrate the methods of their production. A specially featured section is devoted to the art of hand-loom weaving.

The coverlets, representative of several types of hand-loom weave, tell a story in themselves. Coverlets, according to Dr. D. Irvine White, of the museum, are the outstanding products of American hand-loom weaving which have come down to us intact. In colonial days, he points out, the bed often occupied a conspicuous place in the living room, and this probably accounts for the care and effort which was lavished on coverlet making.

Dr. White states that there are four recognizable types of coverlets: simple overshot, "summer and winter" weave, double weave, and jacquard. An example of each type is illustrated.



1. *SIMPLE OVERSHOT, in "Whig Rose" pattern. The earliest variety of pattern-weaving done in the colonies and the only kind of coverlet made until 1725. The design called for small blocks in order that long floats might be avoided. The fabric had a rather fuzzy appearance with no clean-cut distinction between foundation and pattern. White linen was common for the foundation and indigo- or madder-dyed wool for the figure*

2. *SUMMER AND WINTER, in "Wheel of Fortune" pattern. A variation of simple overshot perculiar to American hand weaving, made in a combination of 3/1 and 1/3 twill and often giving the effect of double weaving. This particular sample was woven in indigo and white, in 1800*

3. *DOUBLE WEAVE. The face fabric was joined with back fabric at only the edges of the figures, where the pattern yarns changed from one fabric to the other. Two warps (usually one of linen and one of wool), eight or more harnesses, and two fillings were used. Absence of floats permitted larger figures than in the simple overshot. This sample bears the weaver's name and date, woven in the pattern—"Ann Everit. 12 month 19, 181?"*

4. *JACQUARD DOUBLE WEAVE, in three colors — indigo, rose madder, and white—mixed to provide a color pattern in addition to a weave pattern. Many complicated weaves of this sort were the work of professionals, either weavers located in the towns to whom women took their hand-spun yarns, or itinerants who traveled from place to place with their looms. The first jacquard loom was used in America about 1826; and by 1840, according to Dr. White the production of jacquard coverlets had almost entirely replaced that of other double-weave coverlets*

ADVERTISING PAGES REMOVED

The Overseers Corner

Fried Chicken Dinner

(A letter to the editor)

EDITOR, Overseer's Corner:

In these turbulent days when so much ill is being said against employers by union organizers and sympathizers, many of whom make a specialty of asserting that management has no humane interest in employees and considers them as so much machinery, the following story related to me recently by an old friend is indeed refreshing. It is a true story, and a direct refutation of the malicious charges of some that all employers are inhuman monsters.

My friend was calling on Fuller E. Callaway, Jr., president and treasurer of Callaway Mills, LaGrange, Ga. While sitting in the office, talking with Mr. Callaway, an announcement was made to Mr. Callaway by his secretary that Mrs. Bessie Elliott, employed as a winder, wished to talk with him. She was immediately ushered into the office, and said that she "had been working in Callaway Mills for 27 months and liked her job so much that she wanted Mr. Callaway to know that she wanted to hang on to it for the rest of her life." She added that she had worked in another mill at one time, but for several years following her marriage had attempted "to work out a living" on a farm, together with her husband and children. The family could not make a go of it, and 27 months ago she gave up farm life and with one child went to work in the mill. Saving her earnings, Mrs. Elliott was soon able to make the down payment on a piece of land and erect the house in which she now lives. She keeps a cow that grazes on free pasturage supplied by the mill, maintains a garden for growing vegetables for home consumption, and takes in boarders on the side. She said the free pasture is a big help, especially as fences do not have to be maintained.

Apparently, Mrs. Elliott is not overworked at the mill because she asked Mr. Callaway if he would let her teach winding to those employees who attend the night sessions in the Textile School, built and maintained by the mill for educating Callaway employees in any or all branches of the industry. Tuition in this school is free to any employee who cares to attend classes.

Going back to her financial problems, Mrs. Elliott remarked that out of her earnings at the mill she had paid off all but about $800 of the money Mr. Callaway had helped her borrow to buy land and build her home. The next question was whether or not Mr. Callaway would advise her to borrow more money with which to build another house to rent and derive additional income. When he advised her to wait until she had paid off all her present indebtedness, she told him she "sure would always do whatever he advised, for he had proved to be a good adviser in the past."

Then came the convincing proof to my friend that there is a very close bond of understanding and good feeling between employees and employers. Mrs. Elliott said that she "never was going to be satisfied until Mr. Callaway accepted an invitation to visit with her family and sit down to a real old-fashioned fried-chicken dinner at her table, all of which would be cooked by her." Mr. Callaway immediately accepted the invitation and named a date that would be convenient. Making her departure, Mrs. Elliott again thanked him for his advice and repeated her assertion that she was "right pleased with her job."

After she had gone, Mr. Callaway told my friend that he would look forward to enjoying that fried-chicken dinner with the Elliott family as Mrs. Elliott was known as one of the very best cooks in the county.

My friend concluding his story, said to bear in mind that Fuller Callaway Jr., is the son of the late Fuller Callaway, the founder of these mills, who knew nearly every one of his employees by name; and, like his father, young Mr. Callaway keeps in close touch with the employees either through personal contact or through some one in the main office. One of the few things he insists on is that no one works *for* him—they all work *with* him.

It was emphasized that this little drama is not unusual to Callaway Mills or other mills, the narrator having been present at many similar scenes during the years he has been contacting the textile industry. A.G.H.

Pete and Bill are off enjoying their vacations, but will be back on the job again.

Against Public Reprimand

Editor, Overseer's Corner:

I am heartily in accord with the way Pete's superintendent handled Pete with reference to the mistake he had made. There are some people in the world who might need to be "bawled out" in a crowd or out in the department, but they are certainly not the type to be made overseers, nor are they the best type for operators. Any overseer who has made a costly mistake should not object to being called into the super's office to be reminded of the mistake he has made. If he is of the stuff that good overseers are made of, all he needs is to be reminded. I have always been opposed to these things being done in public as it causes the employees to lose respect for their foreman, and it also leaves a sour taste with the foreman himself. If he is the type that needs the public bawling out, get rid of him—and the sooner the better. S. L. MAVITY

Reprimanding Subordinates

Editor, Overseer's Corner:

Under no circumstances should an overseer correct his assistant in the presence of the operatives. The majority of employees hate to be corrected in the presence of their co-workers; therefore a man in whom one has placed confidence through his sincerity and

CONTRIBUTIONS ***to "The Overseers' Corner" are paid for without regard to length. We will use letters discussing the narrative on this page or any other pertinent matter whether of mechanical, managerial or just plain human interest. Those who contribute kinks or practical helps will be paid additional for an appropriate sketch to illustrate their device. It is not necessary to submit finished drawings. If these pages interest you—contribute something to them to interest others. Address Editor, Overseers' Corner, Textile World, 330 West 42d St., New York, N. Y.***

The Overseer's Corner

EASTERN MAINE WOOLEN OVERSEERS ELECT OFFICERS

THE 41ST ANNUAL field day of the Woolen Overseers of Eastern Maine was held at Lake Sebasticook on Aug. 14. Officers elected were: James Haliday, of Oakland, president; Robert Blake, of Camden, first vice-president; Donald Osborne, of Guilford, second vice-president; Lewis D. Sands, of Newport, re-elected secretary and treasurer. Residing secretaries are: George Cusk, of Old Town; George Bickford, of Lisbon Center; Stanley Roberts, of Fairfield; I. D. Richards, of Dexter; John Getchell, of Skowhegan; Edwin Stevens, of Sebattus; William Blake, of Sanford; James Haliday, of Oakland; F. E. Flanders, of Sangerville; Angus Ronco, of Guilford; William Fraser, of Vassalboro; William Donahue, of Dover-Foxcroft; and Harold Salley, of Corrina. Eight new members joined the organization. Fred L. Babcock, of "Fibre and Fabric", was the principal speaker. Remarks also were made by Will Dow, of Old Town, and David Maddocks, of Pittsfield.

ability to be assigned the responsibilities of an assistant overseer would naturally more so disapprove of public correction.

Sometimes ignoring mistakes by omitting a direct correction, but at the same time letting your subordinates know that the error has not escaped your attention, will penetrate deeper into a responsible character than all the "cane raising" in the world. Give the man a well deserved pat on the back when good results have been accomplished and his hurt pride due to committed mistakes, will prove sufficient correction without rubbing it in. Otherwise the responsibility entrusted to the man is misplaced.

All of us appreciate a little consideration and with the right type of man much more can be accomplished by constructive and considerate treatment than by taking a man's head off and making a show with other employees as spectators.

S. C. VENEY

Favors Service Buttons

Editor, Overseer's Corner:

We all like to be recognized individually; that is human nature. When an employee has been with a company 25 years, it's an evidence that he has performed his duty satisfactorily for a quarter of a century. During this time, he has saved his employer the trouble and expense of "breaking-in" a new employee on his job—perhaps many times. The least the company can do is show its appreciation by recognizing him individually with a service button. An employee may hold his job for a while by virtue of being a friend or relative of the employer, but the boss will get tired of taking care of him long before 25 years have passed and find some way to get rid of him—or he will leave of his own accord in search of "the pot of gold at the end of the rainbow."

All mill men know a high labor turnover lowers efficiency and increases labor cost. Even when there is plenty of experienced help to fill vacancies, it will take them from two days to a week, according to the nature of the work, to get acquainted with and accustomed to their new environment. So then, employees should be encouraged to stay with the company as long as they are physically and mentally capable. The best way to do this is to recognize length of service and give preferences to the employee who has been in service the longest length of time.

Theoretically, employees should be rewarded according to individual efficiency. This would be all right if all employers were free from bias. Unfortunately, however, this is seldom the case as it is so easy to think our friends or relatives are more deserving than others. So, considering every thing, recognizing length of service is the safer way.

J.W.H.

Shorter Hours for Stenographers

Editor, Overseer's Corner:

Most of us must contend with some unpleasantness in our place of employment; perhaps it may be the surroundings, disagreeable co-workers, noise, etc. Some, at a tremendous strain on nerves, must stifle every natural impulse to carry them through the day without going completely off the handle. But everyone seems to be accorded some measure of relief except the stenographer; she is too often regarded as a machine that never needs a let-down. Even the fighter in the ring, between each round, gets his rest periods.

The overworked stenographer, fighting sleep and worn nerves, must keep on the job, fit and fresh, and at peace with the world. The boss finds escape in his golf and other diversions, leaving her to hold the fort, stall off unwanted visitors, and handle rude customers (a type who delights in venting his wrath on stenographers particularly). In a word, she must try to keep normal in an atmosphere often so terrifying as not to be tolerated in even a lunatic asylum.

We read much in advertisements about losses incurred by overworked machines, losses unavoidable and costly because neglected machines were not replaced in time. Is not the overworked stenographer just as much hazard as an overworked machine when it comes to trusting either with important tasks? Is she not as big a hazard as the sleepy driver, who because of stubborn refusal to rest, comes to grief in a disastrous road accident?

There is no attempt here to decry hard work; those in any industry who spend the day dodging it are in the chiseling class and do not deserve a moment's notice to clear out gracefully. But for some, a shorter week would mean a more abundant life; for the stenographers, it would result in greater efficiency. I am convinced it would mean a satisfied boss, a satisfactory stenographer, and lasting harmony in all firms.

GERTRUDE MCARDLE

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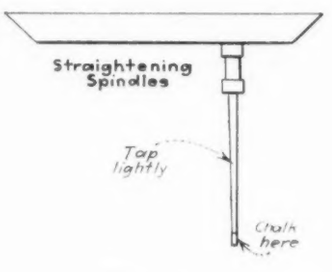
Overseers' Practical Helps

Straightening Spindles

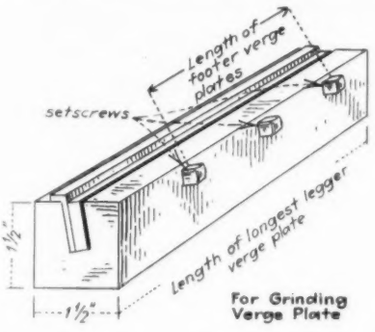
Bent spindles on quilling machines can be easily straightened without being removed from the machine in the following manner: While the spindle is rotating, place a piece of chalk against it so that $\frac{3}{8}$ to $\frac{1}{2}$ in. of the spindle tip is covered with chalk. While it is still rotating, place a pencil lightly against the spindle where it is covered with chalk in order to find the bent side. Stop spindle with pencil mark upward. Place thumb on the pencil mark and press firmly in a straight downward position, and, while pressure is applied, tap lightly in the center on the top part of the spindle as shown in the diagram. Start spindle rotating again and check for straightness. If the spindle is not straight, repeat the operation as it may take a little practice for



one to get the idea of how much pressure to apply and just how light a tap is needed. PETER C. WAYNER.

Verge-Plate Grinding Fixture

Milling, shaping, and filing of worn verge plates were recommended in the very interesting series of articles published in the March, 1936, and April, 1937, issues of TEXTILE WORLD. The writer finds, however, that surface grinding is less expensive and requires no hand grinding. A grinding fixture, as shown herewith, can be made easily from a piece of machinery steel 1½ in. square and the length of your longest legger verge plate. A clamping plate, ¼ in. thick, and three setscrews, ⅜ in. 18 thread, are all the additional material required. Cold-rolled stock if used would be likely to warp while the slot is being milled or when it is removed



from the miller. The end setscrews should be the length of the footer verge plates apart. WALTER A. SIMOND.

Stroboscope

A simple mechanical stroboscope, suitable for studying moving or rotating parts, and enabling the observer to view machinery in motion as if it were standing still, has been developed by Edgard Blackburn, a student at Howard College, Birmingham, Ala., working under the supervision of Prof. Paul D. Bales, of the Department of Physics. The accompanying cuts, published through courtesy of *The American Physics Teacher*, will give an idea of the simplicity of the device which makes use of a small bulb, an 8-in. disk of metal or masonite containing a ⅞-in. hole which interrupts the beam of light, a small shunt-wound motor (the speed of which is controlled by varying the terminal voltage), and some simple lens arangements for directing the rays of light. The parts are compactly arranged in a portable box as shown.

The voltage supply used for this particular instrument is from a motor-generator set, the output of which is adjusted by a series resistor in the shunt field. This resistor consists of two parts—one of 1,000 ohms at 50-watt dissipation, and one of 30 ohms

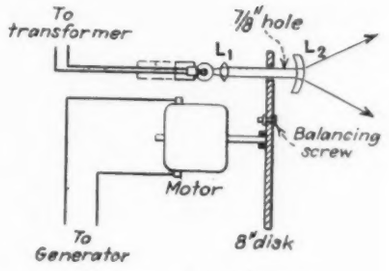


Diagram of stroboscope.

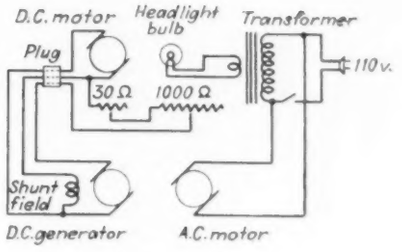


Diagram of circuit.

which serves as a trimmer. If direct current is available from some other source, the voltage at the motor may be varied by a series resistor in the line. All the parts except the motor-generator set are mounted in a box which is painted black on the inside. The motor used gives speeds varying from 25 to 7,000 r.p.m., which may be read on the calibrated scale of the 1,000-ohm resistor when the 30-ohm trimmer is cut out of the circuit.

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Knitting Novelty Yarn

to display its characteristics in a practical fabric

By J. B. Lancashire

THE knitting of novelty yarns presents two problems. One is how to convert the yarns into fabric in a manner which will show them off to the best advantage, and the other is concerned with the most economical way of manipulating them. It is not always possible to achieve both objects at the same time, and the latter consideration must take precedence when the yarns are of such a kind as to be likely to lead to the production of an excessive amount of waste. With nub and slub yarns, for example, the lumps and thick places are prone to give rise to cutting in the ordinary process of knitting, even though by increasing the size of the guides, by choosing a coarse gage of machine relative to the counts of yarn, and by other means reasonable precautions are taken to obviate the trouble. In such cases every effort must be made to find a different method of knitting which will produce equally attractive textures without the same risks.

The purpose to which the fabric is to be applied must influence to some extent the method of knitting. The jersey-cloth texture is eminently suitable for sports garments where a measure of elasticity is desirable, but the reverse side has to be used in order to obtain the best effect. So far as elasticity is concerned, the 1x1 rib texture is superior to jersey cloth; but it is not such a good medium for revealing the characteristic features of the novelty yarn, because the nubs tend to lie hidden between the contracted wales. The kind of rib fabric generally employed for this class of work is that in which the rib wales are fairly widely spaced on the face side, in consequence of which the nubs lying at the back of the plain stitches can be clearly seen.

Tuck-and-Miss Basis

When elasticity is not of paramount importance, the best way of introducing fancy-twist yarns is on a tuck-and-miss basis. By this means they can be securely meshed in a looped structure without being actually knitted in. How the threads are intermeshed is shown in Fig. 1. The method of making the fabric is to knit first a course of plain loops with a ground thread and then to feed the novelty yarn to selected needles which, in the case of latch-needle circular machines, are raised to tucking height to receive it. After another plain course has been knitted, the novelty yarn is introduced again and a fresh selection of needles is made. The actual order of meshing given in the loop drawing involves the selection of needles 1 and 2, 5 and 6, 9 and 10, etc., after the first plain course; needles 3 and 4, 7 and 8, etc., after the second plain course; and so on alternately. Other common arrange-

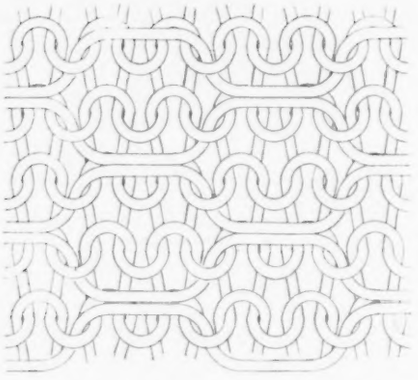

Fig. 1. Texture produced on tuck-and-miss basis

ments include: (a) tuck on odd needles after course 1, even needles after course 2; (b) tuck on needles 4, 8, 12, etc., after first course and center by tucking on needles 2, 6, 10, etc., after second course.

Practically all kinds of novelty yarns can be introduced in this way without difficulty, and a very wide range of counts can be used on any one gage of machine. A further advantage is that all the features of the yarns are visible on one side of the fabric. Normally, use is made of a comparatively thick effect thread so that, if it is meshed in every course, it almost completely covers the foundation texture of plain loops. Fabrics of attractive appearance are obtainable, however, by introducing nub yarns and the like at less-frequent intervals, say after every four or more courses. This method is advantageous when the novelty yarn is very costly.

Modified Lombardi Texture

The looped structure shown in Fig. 1 is a modification of the Lombardi patent texture, which was originally designed to get rid of the objectionable floating threads that characterized most figured fabrics made on one set of needles. Prior to the invention, designs in color were usually developed by selecting needles to knit or not to knit, the yarns being floated behind non-knitting needles. The alternative was to hide the unwanted yarn by tucking it; but the result was virtually the same, inasmuch as when two or more tuck loops occurred together in adjoining wales they resolved themselves into one long loose loop which floated behind the face stitches.

The patented method of getting rid of the floating threads was to tuck on every second needle of every group of non-knitting needles. The stitch took two forms. Either the odd needles tucked or cleared while the even needles cleared or missed, at every feed, in which case straight accordian fabric was produced; or the odd needles tucked or cleared at feeds 1, 3, 5, etc., and cleared or missed at feeds 2, 4, 6, etc., while the even needles tucked or cleared at feeds 2, 4, 6, etc., and cleared or missed at feeds 1, 3, 5, etc.—thus making alternate accordian fabric.

Fig. 1 may be defined as a 2/2 alternate accordian texture. Most latch-needle circular machines can be adapted to knit the accordian stitch by utilizing two lengths of needle butt and making partial changes in the cam race. Fig. 2 shows at *A* the arrangement of the cams at any one feed of a typical plain-stitch machine. This system is retained at the feeds which are required to knit the ground texture; but where the novelty yarn is to be introduced, slight alterations are made to facilitate a tuck-and-miss action. The system at *B*, Fig. 2, is designed to enable long-butt needles to tuck while short-butt needles are left at non-knitting level. Cam 1 is a thin cam set far enough away from the cylinder to act on long butts only, the short butts passing behind it. It may not be absolutely necessary to change the clearing-cam guard cam, but the fitting of a flat piece of metal of the shape shown at 2 eliminates the risk of the tucking needles rising too high and so assuming clearing height. To select the short-butt needles for tucking, the cams must be arranged as shown at *C*, Fig. 2, with thick cam 3 to lift all needles to tucking height and thin cam 4 to take those with long butts down to non-knitting level again before the feeding point is reached.

The arrangement of cams for making the texture shown in Fig. 1 on a 12-feed machine would be system *A* at feeds 1, 3, 5, 7, 9, and 11; system *B* at feeds 2, 6, and 10; system *C* at feeds 4, 8, and 12. The needles would have to be arranged in the order of two long butts and two short butts alternately. To avoid unnecessary strain on the knitted loops comprising the foundation texture, the stitch cams should be raised to a relatively high position at the design feeds. The amount of novelty yarn supplied to the needles can be controlled within limits by adjustment of yarn-tensioning devices.

Spring-needle machines of the Wildman type could be adapted for this class of work even more readily than the majority of latch-needle machines, since many of them are equipped with the special cams needed to produce the Rubenstein patent locknit texture. Identically the same stitch as that described is producible on loop-wheel machines by the use of fleece or backing wheels. The loop or curl yarn in astrakhan fabrics is almost invariably put in by tucking and missing with the aid of backing wheels. Where the yarn is placed round the needle beard, it virtually forms a tuck stitch, although it does not go underneath the beard. Many novel effects can be obtained by introducing modern fancy-twist yarns on the same principle.

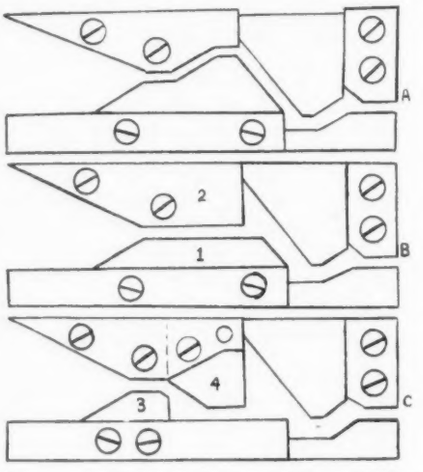

Fig. 2. Cam arrangements for machines operating needles individually

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Regulation of moisture content and control of

Ager Temperatures

in printing with vat colors

By Malcolm Mackay

PRE-COOLING of the cloth before ageing—one of the two general methods of controlling the ager temperature in printing with vat colors—was discussed in the August issue. The other method—that of regulating the moisture content of the ager temperature—will be considered at this time. Among the ways in which the moisture content in the ager is regulated in various plants are the following:

1. DE-SUPERHEATED STEAM—Some plants have their equipment so arranged that they can bring low-pressure steam to the agers. In this case the steam enters the agers at the proper temperature (212° F.) In

other plants the steam is first superheated for use in driving turbines and is then sent to the print works for use in dry cans, agers, etc. The temperature of this steam is very high and it has to be de-superheated before being used for ageing purposes. A de-superheating system can be installed in the steam line, or the steam can be blown through water in the bottom of the ager. The first method is the better, but may give too much moisture and cause the colors to mark off in ageing.

2. RAISE STEAM PRESSURES —On well-covered patterns the pressure on the steam lines in the bottom of the ager should be raised and the exhaust flues opened wider so that the dry steam can be carried off more quickly and be replaced by moist steam. Just enough steam should be turned on the top heating chests to prevent condensation and water drips. If the top chests are too hot, they will dry the moisture out of the steam before it can be used in the reduction of vat colors.

3. MOIST LEADER — Draperies and other well-covered patterns will take up moisture from the steam faster than it can be replaced by new, moist steam. As a result, the goods will become dry, will wrinkle, and will also vary in shade, due to the fact that there is not enough moisture present in the ager to allow a proper reduction of the vat colors. In this case 300 to 400 yd. is aged and then a leader or plain piece of cloth, preferably moistened, run in to allow the ager to cool off and the moisture to be replaced in the ager atmosphere.

Some plants are fortunate enough to have agers wide enough to age two strands of cloth, side by side, at one time. When running well-covered patterns which will absorb considerable moisture from the ager atmosphere, a moist leader or back-gray is run in one side of the ager and the printed cloth in the other. The moisture taken from this moist leader in the ager will replace the moisture removed from the ager atmosphere by the printed goods and in turn help keep the ager temperature at an even level.

4. GLUCOSE—A method sometimes employed in printing draperies with vat colors is to replace the hydrosulphite with glucose, which is a moisture carrier and brings considerable moisture into the ager. Glucose builds up on ager rolls, making it necessary to stop and clean the ager rolls about once every twelve hours. Another drawback to the use of glucose is the fact that the amount to use has to be varied according to the requirements of the different colors.

5. REMOVING DRY STEAM—In this method the ager is equipped with three or four suction fans on each

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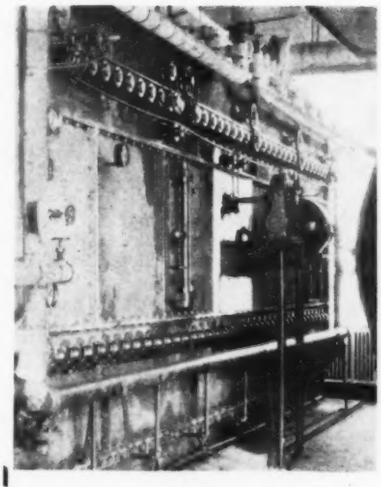

side. These suction fans are connected with a pipe, inside of which is a jet which gives off a fine spray of water. The suction fans remove the dry steam and hot air from between the folds of ageing cloth and force it through the pipe equipped with the water jet. When the dry steam and hot air come in contact with the fine spray of water, de-superheated steam is generated. The de-superheated steam is then blown back into the ager below the bottom ager rollers. This replaces some of the moisture removed from ager atmosphere by the aged cloth.

6. GENERATING STEAM WITH HEAT FROM CHEMICAL REACTION—In this method one to three boxes are placed at intervals between the folds of the ageing cloth. The boxes are constructed of fine-mesh copper screening. The boxes extend the width of the cloth and from the top to the bottom ager rollers. They are open at the bottom, and a pipe, connected with a de-superheater, is run through the bottom opening. The pipe has three perforated cross pipes connected to it, inside the box. The perforated pipes inject moist steam between the folds of cloth. The wire sides of the box prevent condensed moisture from being blown onto the cloth and consequent water spots. In the top of the box is a perforated cold water pipe that drips water down the sides of the box. Steam is generated from this water by the heat which comes from the chemical action of reducing the vat colors.

7. CHANGING BURLAP FLOORING—Most plants cover the flooring plates of the ager with burlap to prevent condensed moisture being blown onto the cloth. This burlap, when new and in good condition, will absorb and hold considerable moisture, and in this manner will help to keep the ager temperature at an even level. When troubled with rising ager temperature, it is a good practice to change the burlap flooring.

8. COLD WATER RUN INTO FRONT OF AGER—In this method a cold-water pipe is connected to the front of the water reservoir in the bottom of the ager. Water is allowed to enter the reservoir slowly and a like amount of hot water is passed out the drain at the rear of the ager. This tends to keep the ager temperature down, but is not highly recommended, as a little too much cold water may reduce the temperature below the proper ageing temperature (212° F.).

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Personal News

Paul Preas, who has been chemist for the American Bemberg Corp. and the North American Rayon Corp., both of Elizabethton, Tenn., has been appointed Tennessee State chemist.

Ellsworth Baker has been appointed by the Farr Alpaca Co., of Holyoke, Mass., to take charge of the engineering department. Mr. Baker has been with the Otis Co., in Ware, Mass.

J. L. Loftis, for three years overseer of weaving at the Woodruff, S. C., plant of the Brandon Corp., has been transferred to a similar position with the Greenville, S. C., plant of the same company.

C. R. Owen has been promoted to the post of cashier of the Bibb Mfg. Co., succeeding **A. L. Adams** who resigned to enter business in Hawkinsville, Ga.

George E. Brigham, retired textile official, and Mrs. Brigham observed their golden wedding anniversary in Warren, Me., recently. Mr. Brigham was last connected with the Rhode Island Worsted Co., Stafford Springs, Conn., as assistant superintendent.

T. W. Snipes has resigned as paymaster of the Bibb City unit of the Bibb Mfg. Co., Macon, Ga., to engage in business in Columbus, Ga.

E. C. Cobb is now overseer of carding at the Oconee Mills, Inc., Westminister, S. C.

Ernest Tyndall, Arthur Green and Willie Tyndall, have been appointed to the respective posts of superintendent

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NATIONAL BODY HONORS N. H.

THREE New Hampshire textile men have been accepted into the membership of the National Association of Woolen and Worsted Overseers and acceptance has been voted on the application of two others. New members are: Horace Morrissette, M. T. Stevens and Son, Franklin. spinner; Albert H. Goddard. Cocheco Woolen Mfg. Co., East Rochester, finisher; and George S. Pickett, Elm Mills, Inc., Tilton, dyer. Applicants are: Herbert C. Whitehouse, Gordon Woolen Mills, Gilsum, superintendent; and Norris C. Emery, Homestead Woolen Mill, West Swanzey, weaver.

night spinning, superintendent night carding, and superintendent winding, it is anounced by Tolar, Hart & Holt Mills.

W. W. Ingle, formerly associated with the E. M. Holt Plaid Mills, Burlington, N. C., is now a member of the laboratory staff of the Charlotte (N. C.) Chemical Laboratories, Inc.

Bill Wells, who has been paymaster at the Winnsboro (S. C.) Mills of the United States Rubber Products, Inc., has been transferred to Hogansville, Ga., where he now has a similar position with the Stark Mills of the same company.

S. C. Mahaffey, for four years night superintendent with Frank Ix & Sons, Inc., of Charlottesville, Va., has accepted a similar position with the Middletown Silk Co., Middletown, Conn.

J. A. Burt, overseer of spinning at the Laurel (Miss.) Mills, has accepted a like post at the Avondale Mills, Birmingham, Ala.

C. E. Willis has assumed his duties as assistant superintendent of Morgan Cotton Mills, Inc., Laurel Hill, N. C. He was formerly cardroom overseer at Lafayette (Ga.) Cotton Mills.

Ernest Shumate is now overseer of carding at the Jefferson, Ga., Mills, Unit No. 1.

J. D. Harelson has been appointed day overseer of spinning at the Laurel, Miss., Mills. He was promoted to this position from assistant in the same department at night.

R. L. Wood has become overseer of weaving at the Jefferson Mills, Unit No. 2, Crawford, Ga.

A. E. Thompson has resigned as overseer of carding and spinning at the Opelika, Ala., Mills and has become associated with the Gaffney, S. C., Mfg. Co.

George Lee has resigned his position with the Lane Cotton Mills, New Orleans, La., to become overseer of carding at the Birmingham, Ala., Textile Co.

H. C. Estes, formerly of Jefferson, Ga., has been appointed assistant superintendent and overseer of weaving at the Jefferson Mills, Unit No. 2, Royston, Ga.

Louis Prendergast, of Hudson, N. Y., has been elected president of the recently formed New York State Textile Overseers' Association. Other officers are: **G. H. Conn,** Averill Park, N. Y., and **Thomas Byron,** Stottville, N. Y., vice-presidents; **Edward Guy,** West Sand Lake, N. Y., secretary and **George Wentworth,** Averill Park, treasurer. Decision to form this body was reached at a meeting of overseers from all over the State, last month at West Sand Lake, N. Y.

J. L. Brannan has resigned as overseer of carding, spinning and twisting at the Mooresville, N. C., Cotton Mills, and is now overseer of carding and spinning at the Durham, N. C., Mfg. Co.

F. E. May, formerly of Meridian, Miss., has become master mechanic at the Birmingham, Ala., Textile Co.

B. K. Sharp has become overseer of spinning at the Oconee Mills, Inc., Westminster, S. C.

Jonah C. Wilson has resigned as overseer of weaving at the Patterson Mills Co., Roanoke Rapids, N. C., and has become overseer of weaving at the Esther Mills Co., Shelby, N. C.

Roy McMahan, formerly of Swannanoa, N. C., has become superintendent of the electrical department of the Oconee Mills, Inc., Westminster, S. C.

J. H. **Burgess,** overseer of weaving at the Mollohon plant of The Kendall Co. at Newberry, S. C., for 13 years, has resigned to accept a similar position with the Fountain Inn, S. C., plant of the Woodside Mills.

W. B. Williams, overseer of weaving at the Calhoun, S. C., Mills, has been transferred to overseer of weaving at the Toxaway unit of the Gossett Mills, Anderson, S. C.

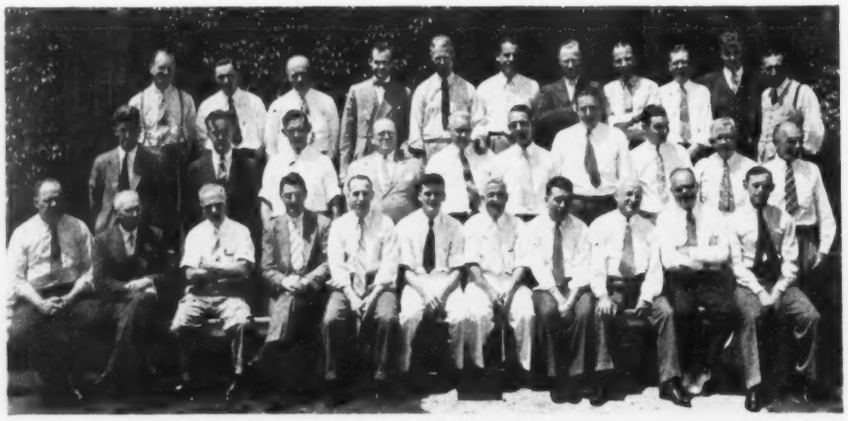
C. R. Moore recently resigned as overseer of spinning at Chicopee Mfg. Corp. of Ga. at Gainesville, Ga., is now overseer of spinning at Cedartown (Ga.) Cotton Export Co.

Paul Hawkins has been appointed assistant to the overseer of the carding, spinning and winding departments of the Riverside unit of the Gossett Mills, Anderson, S. C.

Stanton Duvall, of Social Circle, Ga., has been named assistant superintendent, Calhoun Mills, succeeding **Ben Sharpe** who has gone to Oconee Mills, Westminster, S. C.

VACATION WITH PAY

Burlington Mills with plants in North Carolina, Virginia and Tennessee, is understood to be giving all employees a one-week vacation with pay this year. This would amount to at least $150,000, it is estimated. Each employee may select any week he wishes for his vacation within a period of several months. The following announcement was made by an official of Burlington: "Believing that the employee in the mill is entitled to a holiday just as much as a clerk or executive in the office, and that the employee's earnings should not be penalized while taking his rest, this corporation has provided a vacation plan for operatives who have been regularly employed." It is emphasized that the vacation plan this year is in the nature of a test, and that its continuance depends on competitive market conditions and on the reaction with which the plan is received this year.



Sales force and mill officials of Chicopee Sales and Chicopee Mfg. Corps. at annual meeting in Chicopee Falls, Mass., July 30, and 31.

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S. C. Davis, formerly head of the carding and spinning departments of the Talladega (Ala.) Cotton Factory, is now employed as overseer of the weaving department in one of the Callaway Mills group located at LaGrange, Ga.

J. A. McGaha has become overseer of the cloth room of the National Weaving Co., Lowell, N. C.

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400 AT HIS PARTY

MORE THAN 400 employees of the Hopeville Mfg., Co., Worcester, Mass., attended an all-day outing at Point Breeze, Webster Lake, Aug. 7. Bathing and boat rides were enjoyed, followed by dinner. The host of the day was George A. Bigelow, president of the firm. Mr. Bigelow spoke briefly of conditions in the woolen industry and complimented his workers in their cooperation with the concern during the trying times of the depression. A loving cup was presented to Mr. Bigelow on behalf of the employees by Lorraine Dion, following a speech by Theresa Labrie who told of the esteem in which he is held by his employees. Mr. Bigelow presented gifts to many of the workers, including William Gallagher, spinning foreman and Michael Mulvihill, treasurer of the company.

Questions & Answers

Lace Machines

Technical Editor:

I have been trying to get information concerning lace machines—one for small industries. Inclosed you will find a sample of lace which is hand made of carpet warp or crochet warp and worked with double thread that gives it its coarseness. I do not expect any machine to make a lace that will be exactly like the handmade sample, but something that will resemble it is what I am interested in.

Lace-making machines are of five types—the bobbinet machine, the bobbinet jacquard machine, the Levers lace machine, the Nottingham lace-curtain machine, and the lace braiding machine, usually called the Barmen lace machine. There are no machines of the second type in the United States, but the other four types are operated in the domestic lace industry. In addition, some articles which are commercially known as lace are made on certain types of knitting machines, and on two embroidery machines—the Bonnaz or Cornely machines and the Schiffli embroidery machine.

The sample submitted, however, could not be imitated successfully on any of these machines. The nearest approach would be made on either the Levers lace machine or the Barmen lace machine.

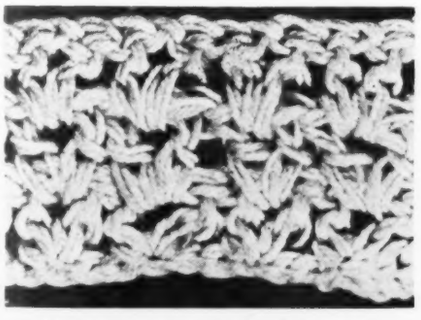
Levers lace machines are not built in the United States, and the 640 used in the domestic lace industry have all been imported. The machine is about 10 ft. high, 10 ft. wide, and between 40 and 50 ft. long. The weight is about 15 tons, and the price in 1932 of a machine to produce lace 184 in. in width was $5,203. Smaller machines are seldom made. These machines on entering the country are subject to a duty of 30% ad valorem, thus bringing the value with duty to $6,704 in 1932.

The machines are so heavy that the buildings which contain them must be specially constructed. Further, certain accessory machinery for the preparation of warps, etc., is necessary. Other handicaps to commencement in the lace industry are that certain cotton yarn which is necessary in making lace as the equivalent of filling threads, of which thousands are used simultaneously in every lace machine, is not obtainable in the United States and is imported from England; and men to operate the machines and prepare the drafts or specifications of the patterns are mainly English or French. Their entrance to this country for employment of this nature is entirely controlled by the Department of Labor. It should be stated that it is hardly possible to make an economic success of a lace business with one machine; and at least ten, in ordinary circumstances, constitute a small plant.

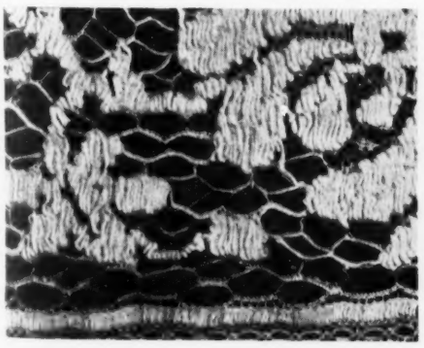
Of the second type of machine mentioned, the Barmen lace machine, there are about 1,000 in this country operated by three firms. These machines were formerly built by a firm of textile machinists at Reading, Pa. The firm has, however, discontinued their manufacture, and any additional machines required at the present time a built by the operating firms or imported from Germany.

The machine is much smaller than the Levers lace machine previously described, is of circular form, and the price in 1928 (the latest date for which a price has been obtained) was, for a small machine of 44 spindles, $377. The duty in this case is 40% ad valorem, which raised the price to $528 in 1928. In addition, there is the cost of transportation from Germany and other incidental expenses. The production of an individual machine is so small that it is necessary to operate large numbers to obtain satisfactory commercial results. The smallest plant in the United States operates 156 machines; and the largest plant, 500.

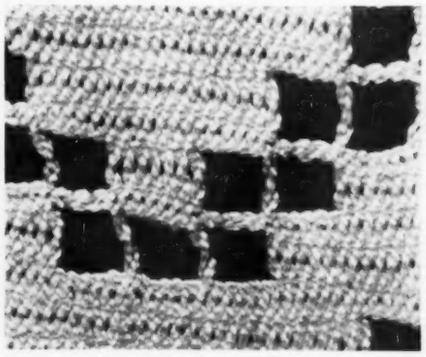
It will therefore be seen that in neither case is the commencement of the business in a small way commercially advisable, especially in view of the fact that the industry may be considered to be possibly the most technically difficult of the textile trades and an experience of several years is necessary in order to obtain the requisite knowledge for the successful conduct of the business.



Handmade lace submitted by reader



Lace made on Levers machine



Lace made on Barmen machine

Scroop Finish on Glazed Yarn

Technical Editor:

We are desirous of getting a scroop finish on glazed yarn, about size 24/3. Any information you may render us will be greatly appreciated. (8454)

Take a thread dresser and remove the brushes. At the creel end fit a double-jacketed steam-heated trough with a 4-in. brass roll revolving at a speed of 2 r.p.m. in 132° hot paraffin wax, with the roll half immersed in the wax. Run the glazed thread from the creel to the wax roll, giving ½-in. contact, thence to the take-up at the full speed of the machine. Probably tension bars will be required; if necessary, put on temporarily with wooden dowels.

Streaks in Polo Cloth

Technical Editor:

We are mailing a piece of cotton polo cloth dyed in a blue shade and containing a dark stripe on each side of the fabric. We have checked back on this cloth and find that this stripe is present before running over our finishing machines and must be the edge lines of the gray cloth. If you can advise us as to a method for removing these lines, we shall appreciate it. (8443)

Apparently this fabric was knit a considerable period of time prior to dyeing and the roll of cloth was probably stored

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in the open where it was exposed to dust and light. Upon dyeing, the exposed edges of the fabric took up more dye than did the unexposed portions.

It will be difficult or impossible to remedy the defect in the finished goods. If you will boil out the fabric with soap and soda ash, strip, and redye, the streaks may be somewhat less noticeable. However, this treatment will tend to harshen the fabric.

If you have on hand any more gray goods which have been stored in the open, we suggest that you give them a thorough boil-out for 1½ to 2 hr. with a good scouring agent, such as one of the pine-oil compounds, together with some soda ash. Follow this treatment by a half bleach. This procedure should reduce the danger of streaks and result in brighter shades.

To avoid the streaks in the future, we recommend that all gray goods be stored in bags or put in piles and the piles covered with cloth or paper to prevent exposure of the knit goods to light and dust.

Spots on Knit Goods

Technical Editor:

We have had some difficulty recently with a small black spot that gets on our cloth here and there, and we do not know whether it occurs in our knitting room or in the bleach plant. It appears rather heavy, indicating that it got on in the bleach plant. If it got on in the knitting room, it would be somewhat subdued going through the bleaching process. Also, we find we can take this out with cleaning fluid. Will you kindly examine this spot and give us your opinion as to what this is. (8446)

Examination of the fabric under the microscope shows that the spot is short-staple cotton lint that has been contaminated with lubricating oil and grease. No doubt the lint and dust from some bearing has been scraped off or blown off in cleaning the machines and it has dropped down or blown into the needles while the goods are being knit. This is evidenced by the fact that the stain is on one side of the fabric and not on the other. We are quite certain that the spot originated in the knitting room, by reason of the fact the stain is marked off on only three of the courses and it has not affected the yarn in its entire length. In one of the courses the stain is marked off in three places approximately ¼ in. apart. In the next course there are two stains about the same distance apart. In the following course there are three stains; two are ¼ in. apart and the next is ¼ in. from the nearest stain. The stain is on one side of the yarn and not twisted into the yarn.

The stain is darker after going through the bleach because of the fact that there is a certain amount of iron and other metallic substances contained in the stain; during the bleach they become oxidized and turn darker. The mechanical action in processing, plus the solvent action of the boil-off material used in preparation, tends to spread and smear the stain.

White Specks in Silk

Technical Editor:

I shall appreciate your advice regarding the inclosed skein. What caused the white specks? These do not appear to any extent before boiling off. It is 13/15 Japan, 83%, 3-thread, 8 turn, right twist and soaked with soap and neats-foot oil. (8464)

The white specks all disappear on boiling the yarn in a soap liquor. It is evident, therefore, that they are due to insufficient degumming. The silk may have been of a hard nature. Such silk requires a longer boiling-off than silk of soft nature.

Twist Contraction

Technical Editor:

For several months I have been a subscriber to TEXTILE WORLD and have been benefited from it many times. I am now confronted with the problems of finding yards per pound of finished tire cord of various constructions.

I find that I do not have the proper formulas or charts to find the yards per pound of cord from a theoretical standpoint. As you may know, this is frequently done by measuring 12 yd. of finished cord and finding the yarn number by weighing the cord, then multiplying by 840, thus giving yards per pound. I should like to know a way of figuring this by using the size of spinning yarn and the construction of the cord.

Let me give you an example of a problem of this kind. Two ends of 15s spinning yarn are twisted together with 18 turns per inch inserted. Then three ends of this ply yarn are twisted together with 8½ turns per inch. What would be the yards per pound of the finished cord figured from a theoretical standpoint?

In making tire cord of various constructions, we have a standard for yards per pound laid down in our specifications. But if we did not have standard specifications and wished to make a tire cord of a new construction, how could I obtain a standard yards per pound?

I believe if I had charts showing the contraction of cord when a certain amount of twist is inserted, I could figure this. (8414)

We do not know of any place where this information can be found, nor do we know of any extensive research which has ever been undertaken to determine those constants necessary to modify the usual constants as the various factors affecting the twists are varied.

There is no question that the contraction which takes place when a yarn is twisted is extremely variable. It is practically an unknown quantity, since it is affected by the size of yarn, kind of cotton, amount of twist, front-roll speed, drag of the traveler, and amount of balloon created by the yarn in its passage from the thread guide to the traveler. It also varies with the size and number of plies, with the humidity, and with the temperature of the twisting room.

To determine these constants accurately for every variation, therefore, would lead to a great amount of experimental work.

Machine companies building twisters are up against exactly the same difficulty that you face. When they are called upon to furnish change gears to produce a certain twist per inch in a certain line of cable yarn, they have to arrive at these gears by actual trial after the calculation has been completed. There is no direct ratio between the twist per inch and the twist change gear. For example, assume that a certain twist change gear is put on a twister and the required size of single yarn and the required number of ply yarns are twisted. On test, the ply yarn will be found to have a certain amount of twist. The change gears are then modified by the ratio between the actual twist obtained and the twist desired and another trial is made. Again the twist is tested, and it is found that the desired twist has not yet been obtained and another modification of the change gear is necessary. The reason for this is that the length of yarn delivered by the front rolls is changed each time the twist gear is changed and the contraction is also changed. Therefore, each time the change gear is changed, not one variation is introduced, but two or more. This means that no simple formula is possible and that the matter must be determined by a system of trials and experiments.

In addition to these last-mentioned variables there are the pull of the traveler and the extension of the balloon as the bobbin constantly changes size.

Worsted Without Combing

Technical Editor:

I should like to have you advise me if a hand-knitting yarn can be manufactured satisfactorily by carding worsted stock on a worsted card, then gilling the stock in gill boxes, and going from the gill boxes to the drawing, in this way leaving out the combing. Can you put me in touch with any mill operating in this way? (8434)

Worsted yarns are made from combed wool for the following reasons: (1) Carded wool contains both neps and vegetable matter. (2) It also contains a high percentage of short fibers. The neps, vegetable matter, and a certain percentage of short fiber must be removed in order that the material may be processed into a satisfactory yarn.

Neps are not wanted in either a woolen or a worsted yarn; but length is not so important in the staple used for woolen yarns and the carding can be more severe. Hence carding is relied upon to open up the neps; and, furthermore, the settings are such that very few neps are formed.

Vegetable matter can be and is removed by carbonizing either the scoured wool or the woven fabric. Yarns could be carbonized also.

In a woolen yarn all the available fiber in the carded stock can be spun into yarn. In worsted manufacture the short fiber, when it is left in, forms small groups known as slubs; and, in addition, it is possible to produce only thick counts from such uneven staple.

Combing conveniently, in one process, removes the undesirable portions of the card sliver, with the result that the combed wool is comparatively free from both neps and vegetable matter and it has a better average staple length.

Consumers naturally object to physical contact with vegetable matter in either woven or knitted fabrics. In addition, the vegetable matter will not take the dye; and, when the material is not carbonized, speck dyeing or spotting (covering the specks by penciling them), or both, must be resorted to. Neps, when in evidence in knit goods, destroy the attractiveness of the garment.

It may be possible to produce fair yarns of low counts from coarse wools which have not been combed, if intersecting gill boxes and the Anglo-Continental system of worsted drawing are used. There is also the possibility that yarns could be made from uncombed, recarded soft waste produced in worsted drawing and spinning.

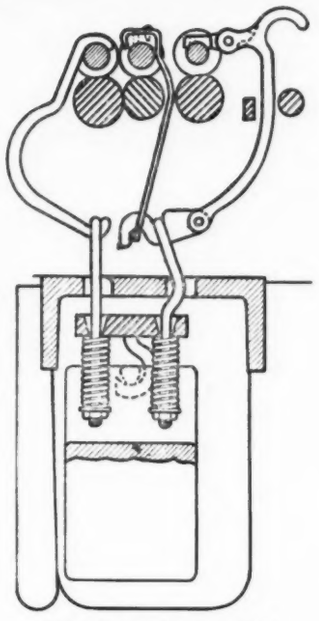
At present we know of no mill which is producing worsted yarns from uncombed wool. A few years ago there was a very small plant which made yarns from uncombed card sliver, and these yarns were woven into fabrics on hand looms. The idea was to duplicate the homespun effect.

New Machinery and Processes

Cotton Roving System

• The system of roll weighting applied by Saco-Lowell Shops, 147 Milk St., Boston, to its new Model J1 long-draft roving frame, as described in detail on page 107 of the July TEXTILE WORLD, has now been applied to three-roll roving. The result is the Saco-Lowell Model M drafting system, which resembles the Model J1 in many particulars, including construction of rolls and interrelated design and construction of roll stands and cap bars. It is capable of drafts up to 8 on 1-in. cotton and is applicable to existing frames.

Since the weighting, which is now known as Uniset Weighting, is here applied to three rolls instead of four, the modification necessary to its new adaptation was one of simplification; and a comparison of the accompanying diagram with the original description in July should make its design and operation entirely clear.



ROLL-WEIGHTING

Full-Fashioned Knitting Machine

• A new high-speed, high-production Reading full-fashioned hosiery machine has been developed by Textile Machine Works, Reading, Pa. It embodies the following improvements over previous models:

Automatic regulating motion combined with automatic loose-course motion, the latter designed to permit the use of three different loop lengths automatically.

Automatic draw-off motion, replacing the old weight and pulley method, eliminating the human element in making draw-off-tension changes and thus reducing the possibility of spoiled sets caused by the knitter failing to set this mechanism properly.

Automatic operation of camshaft shock absorber.

Positive, cam-operated, carrier-rod rocker and other special rocker units.

Improved wide-chain motion combined with automatic course counter, designed to reduce greatly the chain length required. Special footer course counter integral with chain motion, providing for instant changes in foot sizes.

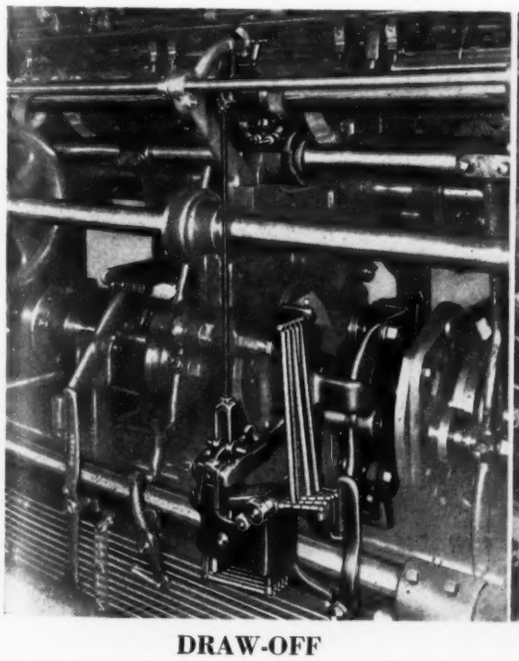
Improved Coulier motion with Alemite lubrication system; two-speed, double-shaft, for sturdier friction-box arrangement; high splicing speed; split, light-metal, friction boxes provided with bronze bearings; and stop rods on leggers to aid in holding friction boxes when carrier rods hit their end stops, thus eliminating carrier-rod buckling and greatly reducing strain on narrowing head.

BTA variable-speed motor drive with dynamic braking, which provides the following advantages: Allows instant in knitting speed of from 30 to 72 courses per minute by shifting the brushes manually. Provides automatic reduction of speed during narrowing or lace-forming operations from maximum to any point between 40 and 50 courses per minute, resulting in a material saving of time. Dynamic braking insures quick stops without maintenance troubles, which usually occur where ordinary magnetic brakes are used. High power factor, averaging approximately 90% during the knitting of a set and making it possible to operate the machine at high speed 67% of the time.

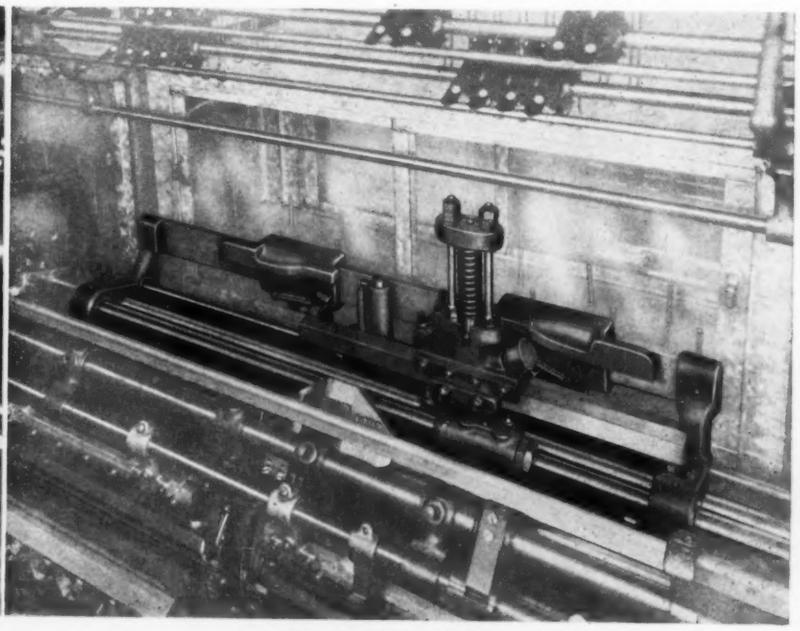
Switches of the mercury-tube type, eliminating all direct-contact switches with the consequent rapid wear of contact points under heavy service.

Ball bearings for handwheel shaft.

Adjustable dogs on carrier rods at reinforced salvage heads and split block to



DRAW-OFF



SHOCK ABSORBER

provide for rapid changes in instep sizes or general stocking design.

Adjustable stops on reinforced selvage nuts, providing flexibility for knitting double-pointed black heel and other designs. These stops cover the entire width from selvage to instep.

Conditionaire — automatically controlled air conditioning of moistening boxes. These machines will also be equipped with room conditioning apparatus served by the Conditionaire unit whenever desired.

Adjustable-tension feltless moistening troughs with water-leveling device.

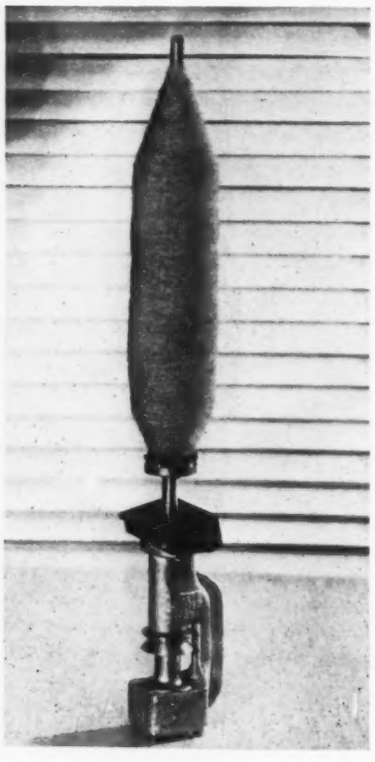
Corrosion-proof protecting aprons with drain gutters for disposing of excess moistening fluid.

Thirty-needle-movement center lace attachment, using same-type pattern screws as the regular lace-clock attachment and point positioning mechanism combined with narrowing head. This attachment allows the production of designs covering a wider needle range without the making of blind dips, increases the flexibility of the machine as concerns the making of lace and net designs, and greatly simplifies the changing of designs through the use of the regular lace screws.

Certain features of earlier models embodied in the new machine include alternating three-carrier attachment, balancing cams, camshaft air brake, cotton-sole attachment (footer), Coulier-motion safety switch, double-spindle reinforced selvage attachment with independent control for right and left sides, for forward and reverse motion of nuts; device for using alternating carriers in production of heel-in-heel reinforcement, lock-stitch attachment, oscillating draw-off motion, reinforced-selvage safety switch, safety release for narrowing lift shaft, single needle bars, wide sinker heads, and water-cooled friction shaft.

The new 26-section leggers are 46 ft. 1½ in. in length, contain approximately 130,000 parts, and weigh approximately twelve tons.

The 30-section footers that are recommended for use with the 26-section leggers are 43 ft. in length and are capable of handling the production from three leggers.



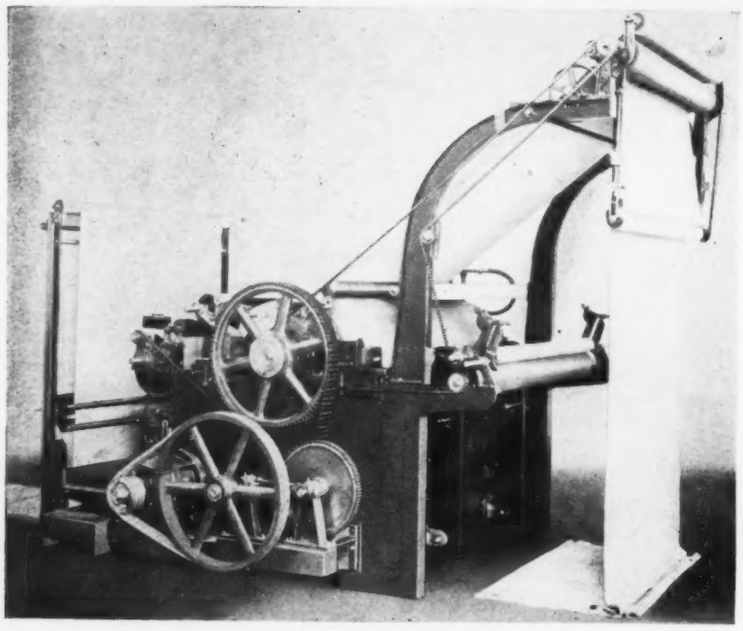
SPINDLE

Spindle Assembly For Large-Package Mule

• Johnson & Bassett, Inc., Worcester, Mass., recently perfected a new spindle assembly for use with its Giant-Package mule. The design substitutes an individual ball-bearing step for each spindle in place of the usual step rail. This step is an integral part of an extra-heavy spindle bolster, and supports the ball-bearing housing which floats when the spindle is rotating. Thus, the spindle is permitted to adjust itself to variations and eccentricities in loads and to maintain rotation in its gravity axis. The ball bearing is inclosed in a dust-proof, grease-tight cup and requires lubrication only once every two years through an Alemite fitting in the base of the cup. The foot of the spindle is ground concentric with the bearing of the spindle at the collar board within plus or minus limits of 1/10,000 in. Besides eliminating vibrations, this new assembly reduces setting-up time and frequent alignment of collar-board bearings. It also tends toward greater accuracy in size of threads, more yarn per bobbin due to a tighter and better wind, and less variation in size of yarn. It is said that spindle-speed variation has proved to be as small as 0.1% of the operating spindle speed. This is in part due to the fact that the spindle is driven by a sectional band equipped with a tension regulator. The collar board is drawn steel and has a Durex absorption bushing.

Rotary Cloth Press

• A rotary cloth press designed to handle woolen and worsted cloths at speeds up to 25 yd. per min. has been placed on the market by David Gessner Co., Worcester, Mass. The machine, known as Model 20 Hi-Production press, is made with pressing parts materially enlarged. Cylinder is composed entirely of steel so that it can be electrically welded and its size maintained in case of possible damage through dryer pins or other metal parts coming through with the cloth. The control of the pressure is simple and no adjustment is required in changing from light to heavy pressure. Pressure is applied electrically and automatically as the press starts, and is removed automatically when it stops. The machine may be equipped with either variable-speed transmission or with two-, three-, or four-speed motors.



PRESS

Extractor

• Improvements in design and structural details which have been embodied in the new Standard extractor placed on the market by Fletcher Works, Inc., 202 Glenwood Ave., Philadelphia, are listed as follows: curb of welded, boiler-plate steel; basket, either in Monel metal or with tinned spun-copper side sheet and top ring, and tinned-steel bottom; spindle and bearings flexibly mounted between heavy rubber rings, adjustable for compression;

EXTRACTOR

ball and roller bearings throughout; equipped with a convenient locking-type foot brake with renewable band; aluminum safety cover fully interlocked to comply with all safety laws; motor (with V-belt drive) vertical mounted with starting switch on machine; attached angle countershaft equipped with clutch and tight and loose pulley; automobile transmission from horizontal to vertical countershaft; V-belt from vertical countershaft to extractor spindle.

NEWS OF SUPPLIERS

• **Veeder-Root Co., Inc.**, Hartford, Conn., has moved its Greenville, S. C., office from the Woodside Bldg., to 231 W. Washington St., where larger quarters have been taken.

• **Glidden Co.**, Cleveland, O., opens a new branch office in Charlotte, N. C., this month to take care of requirements of the Piedmont section of the Carolinas. Olaf S. Noreen will be manager of the new office.

• **Royce Chemical Co.**, Carlton Hill, N. J., at its annual meeting elected E. E. Yake a director of the company. Mr. Yake joined the company Jan. 1, 1937, as assistant to the president.

• **Worthington Pump & Machinery Corp.**, Harrison, N. J., reports that unfilled orders on July 1 were 81% greater than on the same date last year, and were at the highest level in 17 years.

• **Westinghouse Electric and Mfg. Co.**, East Pittsburgh, announces formation of a new products division which will focus on development of lines of activity which either are new in the art or which have not been previously undertaken by the company. This division will include separate engineering, manufacturing and sales departments. H. M. Wilcox is manager with H. W. Tenney as engineering manager, and George F. Begoon as sales manager.

• **Carrier Corp.**, Newark, N. J., announces that Willis H. Carrier, chairman of the board, discussed outstanding engineering developments in the air conditioning field before a three-day meeting of 150 key Carrier engineers from all parts of the United States, last month. The meeting was held at the Newark plant, prior to Mr. Carrier's departure on a three-month trip to South Africa, where he will inspect the Carrier air conditioning installation at the Robinson Deep Mine in Johannesburg.

• **American Rolling Mill Co.**, Middletown, O., announces that Marvin Marsh, special ARMCO sales representative in the Kansas City territory since Jan. 1, 1935, has been named manager of the company's newly created district office at 7100 Roberts street, Kansas City, Mo.

• **Mathews Conveyor Co.**, Elwood City, Pa., announces the opening of Detroit Sales-Engineering office, at Room 319, Curtis Building, 2844 West Grand Blvd. Two conveyor engineers, familiar with the Michigan territory and its requirements will be in charge.

• **Monsanto Chemical Co.**, St. Louis, Mo., announces that R. J. Hawn has been elected vice-president of the company. Mr. Hawn had been a vice-president of Swann Chemical Co., prior to its absorption by Monsanto in 1935.

• **Republic Steel Corp.**, Cleveland, O., announces that four new distributors for tubular products have been appointed as follows: The Bluefield Supply Co., Bluefield, W. Va.; Ormand Plumbing Supply Co., San Antonio, Texas; J. Gaber Co., Houston, Texas, and Morgan's Inc., Savannah, Ga.

• **New Departure Division, General Motors Corp.**, Bristol, Conn., has issued a statement paying tribute to the life and career of George W. Fowler, Chicago office manager, who died last month following an extended illness. Mr. Fowler, who would have completed 20 years with New Departure next December, founded its sales and engineering office at Chicago. "The company's successful operation in mid and far West," the statement asserts, "is a monument to his character and ability."

• **A. E. Staley Mfg. Co.** announces that H. F. (Smiley) Taylor, Jr. has been promoted to represent the company in North Carolina and Virginia, handling textile starches, corn syrups, and other bulk department products. Mr. Taylor

H. F. Taylor, Jr.

is a native of North Carolina, and a graduate of North Carolina State College. He has been with the Staley company for a number of years. John A. Harris, whom Mr. Taylor succeeds, is being promoted to Ohio as State Division Manager for Staley with headquarters at Columbus.

• **International Nickel Co., Inc.**, New York, announces the addition of Wayne Z. Friend to the development and research staff. He will devote most of his time to technical service on corrosion resisting materials.

• **Bunting Brass & Bronze Co.**, has removed its Kansas City branch sales offices and stockrooms to 1922 Grand Ave., where it is installed in newly equipped and much larger quarters, which will facilitate service in that area. Gordon Schutzendorf has been appointed sales representative of the company in the Eastern territory, with headquarters in New York City.

Charles P. Gulick, president of the National Oil Products Co. of Harrison, N. J., poses for a "quick one" with his son, George Nye Gulick, on the Lake Placid Club golf course. Young George, who graduated from Northwood School at Lake Placid, will enter Rutgers University this Fall.

• **American Lumber & Treating Co.**, Chicago, announces that J. F. Linthicum, newly elected executive vice-president, took up his new duties Sept. 1. For the last 24 years Mr. Linthicum has been associated in various important capacities with the Aluminum Co. of America.

• **Joseph T. Ryerson & Son, Inc.**, Chicago, have announced a plan, which the company feels will aid steel users to secure more uniformly satisfactory results. The system, to be known as the "Ryerson Certified Steel Plan," undertakes to select whole heats of steel that have particularly desirable qualities, make thorough tests and give the user a report on the analysis, tests, etc. The

Procter & Gamble

Centennial

Just 100 years ago last month William Procter, who made candles, and James Gamble, who made soap, formed a partnership, and with one assistant started business in a small shed in Cincinnati. That shed developed into the Ivorydale plant of Procter & Gamble Co., which up to the turn of the century was the only plant of this prominent manufacturer. There are now eight additional plants in this country and three abroad.

Procter & Gamble have been pioneers not only in manufacturing, but in such fields as chemical research, employing a plant chemist nearly 50 years ago; employee relations, establishing a profit sharing plan in 1887; advertising, running the first Ivory Soap ad in 1892. Looking back on 100 years, the company rests its success on (1) good value of product, (2) mass production of sound advertising, (3) fair, four-square selling policies.

steel is tested for chemical and heat treatment characteristics and complete data is prepared for delivery to every customer buying the steel, whether only a few bars or several tons.

• **Hercules Powder Co.,** Wilmington, Del., has opened an office in the Johnston Building, Charlotte, N. C. Frank U. Rapp, with headquarters at the new office, will call on Southern mills.

• **B. F. Goodrich Co.,** Akron, O., announces the appointment of O. F. Fentriss and J. O. Cole to sell Koroseal materials to the southern textile industry. Mr. Frentiss, headquarters at Atlanta, will cover Georgia, Alabama, Mississippi and Tennessee. Mr. Cole, headquarters at Greenville, S. C., will call on the textile trade in North and South Carolina and Virginia.

• **Commercial Investment Trust Inc.,** a subsidiary of Commercial Investment Trust Corp., announces that G. Hall Roosevelt has joined the executive staff. Mr. Roosevelt was for many years with General Electric and thereafter was chief financial officer of the City of Detroit, since which he has been engaged in engineering activities.

• **Crompton & Knowles Loom Works,** Worcester, Mass., has recently completed two orders totalling 856 looms.

Part of the C. & K. export order of 546 looms being swung on shipboard.

Of this number 546 were made for Tootal, Broadhurst, Lee Co., Ltd., with headquarters in Manchester, Eng., and will be used for making a fine cotton cloth. This is the largest single export order Crompton & Knowles ever filled, and was secured in competition with loom manufacturers from all parts of the world. The second order, 400 looms, was made for the recently completed plant of the Carter Fabrics Corp., at Greensboro, N. C., which is running on rayon and other synthetic textiles.

• **Vaughan Belting Co.,** manufacturers of leather belting, mill strapping and pickers, is erecting a new building to house its plant at Spartanburg, S. C.

• **Cowles Detergent Co.,** Cleveland, O., has appointed L. A. Gregg of Charlotte, N. C., as Southern representative.

• **Chas. M. Mumford,** mill engineer, announces removal of his Boston, Mass., office from 293 Congress St., to Chamber of Commerce Building.

• **Chapman Valve Mfg. Co.,** Indian Orchard, Mass., has elected John J. Duggan and Frederic C. Low, president and treasurer respectively of the company. Mr. Duggan had been treasurer of the company for 20 years.

• **I. A. Hall & Co.,** Paterson, N. J., who for many years have conducted a Pennsylvania branch in Allentown, under the name of the Allentown Reed, Harness & Mill Supply Co., discontinued that branch on Sept. 1. Machinery and stock were moved to Paterson. The sales force in Pennsylvania will be continued under the supervision of John Hall who resides in Allentown.

• **Gastonia (N.C.) Roller, Spindle & Flyer Factory** has constructed a new storage addition on the Second Avenue side of the building.

• **Swan-Finch Oil Corp., New York,** announces that W. L. Nicholson, widely known in southern textile circles, has become North Carolina representative with headquarters in Charlotte.

Textile World Analyst

Textile World's index of textile mill activity for the first seven months of 1937 shows a rate approximately 20% above that for the corresponding months of 1936. However, it is interesting to note that the rate for July alone fell slightly (4%) below that for July last year—the first time any month in 1937 has shown this adverse tendency. This was due largely to the unusual activity last year, since this year's rate in July was still 30% above a "normal" year (1924-31 average) . . . Carded fabric and yarn margins naturally fell off in the uncertainty following the August crop report, but there was not the collapse which has often accompanied such a situation in the past. Yarns showed particularly good resistance. However, prices were largely nominal, due to small business passing. (See Tables I and II.)

Textile World's Price Index Numbers

STARTING with January, 1936, TEXTILE WORLD has revised its price index numbers to a 1923-25 base, to correspond with current statistical practices. Those who wish to continue with indices based on July 1, 1914, for chart purposes or otherwise, can secure conversion factors to change the new figures to the old by writing TEXTILE WORLD, Statistical Dept., 1427 Statler Bldg., Boston, Mass. Figures on cotton manufactures, Aug. 1, 1933 to Jan. 6, 1936 include processing tax.

	Cotton Index Numbers				Wool Index Numbers				Silk Index	Rayon
Date	Cotton	Yarns Gray	Yarns Colored	Cloth	Wool	Tops	Yarns	Cloth	Raw-Silk	Index
1923-25	100	100	100	100	100	100	100	100	100	100
1930 ave.	50	61	61	72	58	61	72	90	109	46
1931 ave.	32	68	46	59	46	49	59	71	82	32
1932 ave.	24	37	37	60	36	40	52	57	21	28
1933 ave.	39	56	55	50	53	59	62	80	21	26
1934 ave.	61	67	70	62	63	70	75	91	17	25
1935 ave.	60	68	67	69	56	58	70	88	22	24
1936 ave.	45	63	63	68	72	78	76	93	23	25
Jan. 1936	48	67	63	68	67	73	75	93	26	24
Feb. 1936	42	62	58	67	72	81	77	93	24	24
Mar. 1936	42	61	57	66	73	81	77	93	23	24
Apr. 1936	43	60	55	64	68	75	76	90	22	24
May 1936	43	57	54	64	67	75	76	90	21	24
June 1936	44	58	57	65	67	75	76	90	20	25
July 1936	48	61	61	70	69	75	75	90	22	26
Aug. 1936	45	62	63	70	70	75	74	90	23	26
Sept. 1936	45	62	63	70	70	75	74	90	22	26
Oct. 1936	45	64	67	71	71	75	74	92	23	26
Nov. 1936	45	65	74	72	78	82	76	100	26	26
Dec. 1936	48	72	80	74	87	90	84	105	26	26
Jan. 1937	48	73	81	76	90	93	88	108	25	26
Feb. 1937	48	74	78	76	90	92	90	108	25	26
Mar. 1937	53	78	80	78	87	88	90	112	24	26
Apr. 1937	53	80	82	80	84	86	90	112	24	27
May 1937	49	75	76	78	82	84	89	112	24	27
June 1937	47	70	71	78	78	82	88	112	25	27
July 1937	45	65	67	78	78	82	88	112	26	27
Aug. 1937	37	59	62	78	80	82	88	112	25	27

Fabric and yarn manufacturing margins follow:

TABLE I. CARDED FABRIC MARGIN

Date	Margin in cents	Date	Margin in cents
August, 1933..	21.4	February, 1936.	16.5
October, 1933	19.1	March, 1936...	15.5
January, 1934	18.4	April, 1936....	14.3
April, 1934...	17.6	May, 1936.....	14.3
July, 1934....	15.5	June, 1936.....	15.3
August, 1934..	16.6	July, 1936.....	16.9
September 1934	18.6	August, 1936..	18.0
October, 1934..	17.4	September, 1936	18.4
November, 1934.	15.8	October, 1936.	21.2
December, 1934.	16.2	November, 1936	25.4
January, 1935..	16.2	December, 1936.	28.1
February, 1935.	16.0	January, 1937..	28.6
March, 1935...	15.9	February, 1937.	26.2
April, 1935....	16.1	March, 1937...	25.6
May, 1935.....	16.0	May 1937.....	23.1
June, 1935.....	16.5	June, 1937....	21.2
July, 1935 ...	15.2	July, 1937 ...	20.1
August 1935...	17.1	August, 1937..	19.4
September 1935	17.9	Aug. 4...	20.0
October, 1935..	17.7	Aug. 11...	19.7
November, 1935.	16.4	Aug. 18...	19.3
December, 1935.	16.2	Aug. 25...	19.4
January, 1936..	17.2	Aug. 31...	18.8

TABLE II. CARDED YARN MARGIN

Date	Margin in cents	Date	Margin in cents
August, 1933...	23.5	February, 1936.	17.5
October, 1933..	20.0	March, 1936...	16.3
January, 1934..	18.3	April, 1936....	15.6
April, 1934....	15.9	May, 1936.....	14.8
July 1934.....	14.7	June, 1936.....	14.6
August, 1934...	15.3	July, 1936.....	15.0
September, 1934	15.6	August, 1936..	16.5
October, 1934..	14.6	September, 1936	16.5
November, 1934.	13.5	October, 1936..	17.2
December, 1934.	13.5	November, 1936	18.0
April, 1935....	14.1	December, 1936.	20.6
September, 1935	15.4	January, 1937..	20.8
October, 1935..	15.8	February, 1937.	21.2
January, 1935..	13.5	March, 1937...	21.3
February, 1935.	13.9	May, 1937.....	21.2
March, 1935...	14.4	June, 1937.....	19.3
May, 1935.....	13.8	July, 1937.....	17.8
June, 1935.....	14.5	August, 1937..	17.2
July, 1935.....	14.3	Aug. 4...	17.1
August, 1935...	15.3	Aug. 11...	16.9
November, 1935.	16.3	Aug. 18...	17.1
December, 1935.	16.3	Aug. 25...	17.5
January, 1936..	18.4	Aug. 31...	17.3

...Free... For the Asking

READERS interested in literature reviewed on this page, may secure copies by writing to TEXTILE WORLD, 330 West 42d St., New York, giving their company connection.

Chain Drives. Morse Chain Co. Booklet presents information frequently needed by plant engineers and production men on plans and specifications for drives, including horse-power tables, etc.

Gears. Continental Diamond Fibre Co. Folder describes construction and uses of Celeron silent gears, with recommended practices for machining, gear information, horsepower rating and other data.

Bearings. Hyatt Bearings Division, General Motors Corp. A 32-page bulletin minutely examines application of company's roller bearings to all types of textile machinery, including carding, roving, drawing, spinning, finishing and other operations; complete with photographs of standard textile equipment and a representative list of textile mills using Hyatt bearings.

Cables. Anaconda Wire and Cable Co. Booklet describes non-metallic sheathed cable for direct burial in the ground; also cites types available, uses, and gives helpful data on application and installation.

Testing. H & B American Machine Co. Catalog No. 10 discusses yarn testing in all aspects, and describes characteristics and advantages of company's testing equipment; complete with diagrams and other operation data, and various testimonials from textile companies.

Motors. Fairbanks, Morse & Co. Attractively covered folder considers specific motor needs of textile industry and tells how company's ball-bearing equipment meets these requirements; features inclosed textile motors for loom drive and open screenless type for frames.

Valves. Cochrane Corp. Folder contains detailed descriptions of multiport relief valves, also giving full information on applications, advantages and general operation; specifications of styles and dimensions, weights and list prices, included.

Pulleys. Link-Belt Co. Folder presents dimensions, tolerances and standard construction data for iron pulleys, giving information on solid and split, single- and multiple-arm machine-moulded pulleys with and without rubber lagging.

Electric Control. Allen-Bradley Co. Folder describes company's solenoid starters, stressing the point that they maintain peak efficiency without "dressing".

Switches. General Electric Co. Folders describe company's line

of outdoor switch houses, complete with switching and metering equipment, and company's moderate-duty outdoor group-operated switch, Type TC.

Corrosion-Resistant Equipment. International Nickel Co., Inc. Bulletin T-9 describes engineering properties of "K" monel, including physical constants, mill working, heat treatment and shop working requirements.

Temperature Control. Foxboro Co. Folder describes company's open-shut temperature controllers, emphasizing their wide range of service from minute tasks to big-scale jobs.

Looms. Draper Corp. Four catalog inserts carry illustrations and descriptive text, respectively, of the following type looms: (a) XK automatic bobbin-changing loom; and (b) same with dobby and extended back for certain rayon weaves; (c) XL model automatic filling for broad sheetings and (d) C model shuttle-changing loom.

Controllers. Cochrane Corp. Bulletin illustrates and describes liquid level controllers for services in the power and process fields, controlling levels and regulating flow of liquids to or from surge tanks, storage tanks, stills, receivers, absorber towers, heaters, condensers and evaporator units.

Electrical Equipment. Trumbull Electric Mfg. Co. Catalog No. 101, 81 pages, describes safety switches, meter service and entrance switches, panel boards, multi-breakers, meter troughs, fuse blocks, etc.; includes comprehensive data on dimensions, ratings, etc.

Looms. Crompton & Knowles Loom Works. Photographic folder, "Photo News", shows unusual snapshots, candid camera style, of company's products in operation, together with interesting diversity of news photographs of persons and scenes in the textile industry.

Knitting. Wildman Mfg. Co. Folder discusses growing market for rayon in men's and women's knitted wear, emphasizing pattern range of company's rayon pattern machine; sample fabric attached to folder.

Materials. E. I. du Pont de Nemours & Co. Handbook contains detailed description of Neoprene, rubber-like engineering material which is claimed to resist deteriorating effects of oil, heat, sunlight, chemicals and oxidation, with facts on specific applications.

Synthetic Chemicals. Carbide and Carbon Chemicals Corp. 78-page booklet, 1937 edition of "Synthetic Organic Chemicals," constitutes an industrial reference manual on the specifications, properties and uses of over 80 aliphatic organic chemicals.

Instruments. Bristol Co. Bulletin No. 490 shows typical examples of telemetering and remote control, and explains in diagrammatic form how these instruments measure, transmit and record readings over a simple two-wire circuit.

Instruments. C. J. Tagliabue Mfg. Co. Catalog No. 1060C describes complete line of company's indicating, recording and controlling instruments for temperature and pressure.

Air Conditioning. Carrier Corp. Illustrated booklet describes company's equipment for industrial air conditioning, refrigeration, and space heating, ranging from a one-room weathermaker to a self-contained centrifugal refrigerating machine for large scale work.

Bearings. Norma-Hoffmann Bearings Corp. Catalog No. F-958, 84 pages, describes company's complete line of precision ball, roller, and thrust bearings; includes tabulated data on 108 distinct series of precision bearings, embracing 3,000 cataloged sizes, and also valuable engineering data.

Materials. The Truscon Laboratories. Bulletin gives characteristics, uses, and advantages of Truscon Mortite, with particular relation to the problem of avoiding shrinkage in brick mortar use.

Miscellaneous. Items having a textile slant appeared in the following publications: July *Cotton Chats*, Draper Corp., discusses "Reducing Slough-offs on High Speed Looms"; August *Esso Oilways*, has stories about Worumbo Mills and about the different rayon manufacturing processes; July *Pioneer*, Electro Bleaching Gas Co. and Niagara Alkali Co., discusses use of polarized light in detecting flaws in fabric construction; third edition *Service Factor*, Sinclair Refining Co. has illustrated feature article on textile printing-machine lubrication.

The Personal Page

Philip A. Vogelman, president of Onondaga Silk Co., has also assumed presidency of Vermont Silk Corp., New York, N. Y., recently formed to serve as the American branch of Vermont & Co., of Paris, France, converters and manufacturers.

William S. Nutter, vice president of the Goodall Worsted Co., Sanford, Me., recently returned from Europe, spoke on "New European Industrial Frontiers and How They May Affect American Industry," over the Columbia Broadcasting System network from station WEEI, Boston, Aug. 19.

Percy S. Howe, Jr., resigned recently as vice-president of Suncook Mills to accept the post of vice-president and director of the American Thread Co. Mr. Howe is well known in the rayon industry, and former president of the National Rayon Weavers Association.

Sheldon S. Yates has been elected president of the Fair Valley Combing Co., Woonsocket, R. I., which firm succeeds the S. & L. Combing Co. Mr. Yates bought the assets of the latter company.

John R. Tolar, president of Tolar, Hart & Holt Mills, Fayetteville, N. C., yarns, has retired from business to enter the ministry. He was ordained to the priesthood of the Episcopal Church recently by the Right Rev. Thomas C. Darst, Bishop of the diocese of East Carolina, in a service at Fayetteville, N. C.

Ed Synan has been appointed manager of the gray goods department of Wamsutta Mills, at New York, succeeding **Horace Woodbury** who has been transferred to the company's mill. **Ed. J. Nugent** has been placed in charge of the New York office. These men were incorrectly referred to in last month's issue as connected with Pepperell Mfg. Co.

Samuel F. Ruben has resigned as president of Merit Hosiery Corp., New York, to become manager of sales of the K. T. C. division of Gotham Silk Hosiery Co., New York.

David C. Carroll has been elected a member of the board of directors of the Marlboro Cotton Mill of McColl, S. C., succeeding **E. E. Strudwick** of Richmond, Va., who has resigned. Mr. Carroll has represented the mill as legal counsel for a number of years.

Leonard Walsh has resigned from the Mt. Hope Finishing Co. to become general manager of Plymouth Finishing Co.

W. D. Kellogg, head of the department of engineering and patent research of the Mohawk Mills has resigned that post to operate Collins Loom Works, Amsterdam, N. Y., of which he is sole owner, having acquired the property from Fred J. Collins, retired.

Wm. G. Barraclough, for 13 years assistant manager of the Marcus Hook, Pa. office of the American Viscose Corp. has been appointed office manager in charge of the company's new plant at Front Royal, Va., now in process of construction. He is succeeded by W. R. Bailor.

Cully A. Cobb, director of the Southern Division, Agricultural Adjustment Administration, has resigned that post to return to private business. No action has yet been taken on his resignation.

Ernest M. Orkin, formerly with Michael Lowy Co., and 30 years in the fabric business, has joined Susquehanna Silk Mills, New York, as stylist.

Harold A. Holborrow, assistant cashier, has been elected assistant secretary of James Talcott, Inc., New York.

Wm. W. Miller, has been placed in charge of the woolen department, Los Angeles office of J. P. Stevens & Co.

Thomas F. Scanlan, Vincent P. Roberts, Jr., Raymond H. Roberts have been admitted to membership in the firm of V. P. Roberts & Co., wool dealers, Boston.

Clifford Holdsworth, superintendent of the yarn division of Goodall Worsted Co., Sanford, Me., with his wife and son, Bernard, has recently returned from an extended trip to England.

R. C. Forrest has become general manager of the two units of the California Cotton Mills, located at Uniontown, Ala., and Selma, Ala.

Hiram B. Day, of the fabric brokerage firm of Pray, Day & O'Reilly, New York, has retired after 34 years in the fine goods field. The vacant post will be filled by **Arthur Cohen** and the firm name will be changed to Pray, O'Reilly & Cohen.

Frazier MacIver, production manager and **Richardson E. Browne,** sales official have been elected to the respective posts of vice-president in charge of production and vice-president in charge of sales, the Phoenix Hosiery Co., Milwaukee, Wis., announced.

J. Bruce McCullough will become associated with John F. Street Co., yarns, Providence, R. I., on Oct. 1. The company will broaden the scope of its business. Mr. McCullough has been active in the field for more than 20 years, the last six of which have been with the Franklin Process Co.

Paul A. Barker has resigned from the sales organization of Rose Mills, Philadelphia, Pa., and will announce his plans after a short vacation.

W. P. Dunson, T. B. Kersey and **B. W. Robinson** have been appointed general superintendents of Callaway Mills, LaGrange, Ga., in a regrouping of the company's eleven plants into three major divisions. Mr. Dunson, former superintendent at Manchester is succeeded there by **J. H. Daughdrill;** Mr. Kersey, former superintendent of Unity Spinning and Oakleaf plants, is succeeded by **Seth Newsom;** Mr. Robinson, former superintendent of Elm City, is succeeded by **C. E. Rich.**

George Walker, principal of the New Bedford (Mass.) Textile School, recently was the guest of the New York City chapter of the New Bedford Textile School Alumni Association at its annual outing.

J. B. Cornwell has been named superintendent of No. 3 plant of the Republic Cotton Mills at Great Falls, S. C., succeeding **M. D. Haney.**

W. F. Summers has been appointed superintendent of the Jennings Cotton Mill, Lumberton, N. C.; the mill resumed operation recently after a long shutdown due to labor troubles. He succeeds **B. L. Estes.**

Basil H. Haraway has been appointed superintendent of the Schoolfield (Va.) unit of the Riverside and Dan River Cotton Mills, succeeding the late D. Howard Dodson.

F. L. Wilson is now superintendent of the Cannon Mills, No. 11 plant, Rockwell, N. C., succeeding T. A. Sherill.

M. D. Haney has resigned as superintendent of Republic Cotton Mills, Mill No. 3, Great Falls, S. C. He has been succeeded by **John B. Cornwell,** associated with the company eight years.

C. C. Dawson, general superintendent of the Cramerton Mills, Inc., Cramerton, N. C., has been elected a director of the Citizens National Bank of Gastonia.

Geo. O. Johnson, formerly at Sycamore (Ala.) Plant of Avondale Mills, has been promoted to superintendent of Mary Ann Plant at Stevenson, Ala.

C. W. Young has resigned as superintendent of Goodyear Decatur Mills, Decatur, Ala., and has been succeeded by **W. E. Floyd.**

A. L. Sanders has been promoted from assistant superintendent to superintendent of the knitting department of Clyde Fabrics, Inc., Newton, N. C.

Textile Calendar

- Textile Operating Executives of Georgia, fall meeting, Georgia Tech., Atlanta, Ga., Sept. 18, 1937.
- Chicago Exposition of Power & Mechanical Engineering, New International Amphitheatre, Chicago, Oct. 4 to 9, 1937.
- National Association of Cotton Manufacturers, annual meeting, Providence-Biltmore Hotel, Providence, R. I., Oct. 6 and 7, 1937.
- National Association of Hosiery Manufacturers, fall convention, New York, Oct. 14 and 15, 1937.
- Fashion Group, Inc., "Fashion Futures—American Edition," Waldorf-Astoria Hotel, New York, N. Y., Nov. 10, 1937.
- Sixteenth Exposition of Chemical Industries, Grand Central Palace, New York, Dec. 6 to 11, 1937.
- American Association of Textile Chemists and Colorists, annual meeting, Bellevue-Stratford Hotel, Philadelphia, Dec. 3 and 4, 1937.
- Fifth International Heating and Ventilating Exposition, Grand Central Palace, New York, Jan. 24 to 28, 1938.

J. W. Norwood is superintendent at the newly organized Durant (Miss.) Mfg. Co. Company is an interest of Real Silk Hosiery Mills, Inc., Indianapolis, Ind.

Earle E. Riddle, assistant superintendent, Laurens Cotton Mills, has accepted superintendency of the Wennonah Cotton Mills, Lexington, N. C., and has begun his new duties. He is a graduate of Clemson College.

W. T. Hunt, formerly of Lumberton, N. C., is now superintendent of the York (S. C.) Yarn Mills, Inc.

Robert Bunn, formerly superintendent of the No. 3 plant of the Harriet Cotton Mills, Henderson, N. C., has been appointed superintendent of the Henderson (N. C.) Cotton Mills, to succeed his father, the late J. Harry Bunn, who served as superintendent for nearly 30 years.

T. H. Wood has become manager of the Oconee Mills, Inc., Westminister, S. C.

George E. McCarthy has been named general superintendent of Farr Alpaca Co., Holyoke, Mass., succeeding **William H. Selley,** who will continue in an advisory capacity.

R. Donald Harvey, newly appointed agent and manager of the Lindale (Ga.) division of Pepperell Mfg. Co., as reported last month.

H. R. Allgrove has resigned as credit manager of Belding-Heminway Co., New York. **Theodore Ulick** has been moved up from assistant credit manager.

J. B. Cornwell has been made superintendent of Republic Cotton Mills, Mill No. 3, Great Falls, S. C.

R. L. Sauls, who has been superintendent of Carolina Narrow Fabrics Co., Winston-Salem, N. C., has accepted the same position with Fiber Mfg. Co., Newton, N. C.

C. J. Meagher has resigned as superintendent of mill No. 3 of Highland Park Mfg. Co., Charlotte, N. C.

Ambrose Smith has been made superintendent at Queen Dyeing Co., Providence, R. I.

Geo. W. Boys is now superintendent of China Grove (N. C.) Cotton Mills.

O. D. Boyd, superintendent of Valley Falls plant of Martel Mills, Spartanburg, S. C., is superintendent of the plant of the company at Elk Mountain, N. C., which has been put into operations after being closed for about six years.

T. B. Hunt has become superintendent of Clover (S. C.) Mills Co. He was formerly superintendent of Atlantic Cotton Mills, Macon, Ga.

Walter Anderson, office manager of Farr Alpaca Co., Holyoke, Mass., since February, has resigned.

J. A. Talbert has become superintendent of Cliffside (N. C.) Mills, succeeding E. T. Combs, resigned.

Obituary

F. Nathaniel Perkins, aged 76, treasurer of the Boston Wool Trade Association since 1913 and one of the leading wool men of the country, died at Boston Aug. 10. He was prominently connected with the Boston market for many years.

Fred A. Rakestraw, aged 62, president, Hyde-Rakestraw Co., cotton yarns, Philadelphia, died Aug. 12 at his office. Mr. Rakestraw, who helped to modernize sales methods and standards in the yarn industry, was treasurer, former president and a founder of the Association of Cotton Yarn Distributors.

Zenichiro Hara, aged 46, vice-president, Hara & Co., raw silk firm, died Aug. 6 in Yokohama. He was a leader in the silk industry of Japan and well known in the American market.

James MacCallum, aged 68, for many years a member of the fabric department of the Celanese Corp. of America, died recently at his home in Ridgewood, N. J. Prior to joining Celanese he was a member of the cotton goods firm of Stull, MacCallum & Wilcoxson.

H. G. Drexel, aged 82, credited with having knitted the first pair of stockings produced by the Propper-McCallum Hosiery Mills, died recently in Dickinson Hospital, Northampton, Mass. He came from Germany 50 years ago and spent 35 years in the hosiery industry.

Emil Hirner, aged 74, retired hosiery manufacturer who held over 40 patents related to hosiery manufacture, died July 14 in his home in Allentown, Pa. He was senior partner of Excelsior Knitting Machine Co. and later a founder of the Novelty Hosiery Co.

George I. Macy, aged 77, for many years identified with the textile industry, died at his home, New Bedford, Mass., Aug. 17. Associated for many years as partner in the cotton cloth and yarn brokerage firm of Frederick R. Macy & Co., Mr. Macy had also served as executive of Wamsutta Mills, North Dighton Mills, the Grinnell and Soule Mill of New Bedford.

Francis H. Jealous, aged 77, formerly resident agent for the Rochdale (Mass.) Mills, of the American Woolen Co., died at Bombay, Me., Aug. 20.

Sims R. Lybrand, aged 49, assistant superintendent, Union-Buffalo Mills, died recently at Spartanburg, S. C.

E. O. Kline, president of Kline Knitwear Mills, Philadelphia, died Aug. 6 after a brief illness.

W. H. Cooper, aged 70, for many years first vice-president of Bigelow-Sanford Carpet Co., died Aug. 25 at Amsterdam, N. Y. Among those surviving is his son, W. B. Cooper, plant superintendent at Amsterdam for the Bigelow-Sanford Carpet Co.

Sorabji Muncherji Rutnagur, aged 72, founder-editor of the *Indian Textile Journal,* Bombay, India, died there July 20. Mr. Rutnagur who edited the magazine for 47 years was widely known in Indian and British textile circles.

William Thomas Henry, aged 75, treasurer and a member of the board of directors of the Fulton Bag & Cotton Mills, Atlanta, Ga., died Aug. 15. He was with the company 40 years.

Arthur L. Burnham, aged 60, for 13 years an engineer at the Jackson Mills of Nashua (N.H.) Mfg. Co., died Aug. 11.

Samuel Mungall, in charge of the fancy dye house of the Amoskeag Mfg. Co., Manchester, N. H., for years, and with that company for nearly a half century, died Aug. 9.

John H. Rutledge, aged 63, treasurer and plant manager, China Grove (N.C.) Cotton Mills, president of the Southern Mercerizing Co., and a leading figure in the cotton goods industry for many years, died Aug. 31 in Charlotte, N. C.

Carl W. Sarkas, New York representative of Globe Dye Works, Philadelphia, died suddenly Sept. 5.

William Wallace, aged 79, founder and president of Statesville (N.C.) Cotton Mill, died Aug. 27.

Wm. G. Rohrer, aged 52, president, Rohrer Knitting Mills, Orwigsburg, Pa., and for many years a leading figure in the knitted underwear industry, died Aug. 1, at his home in that city.

Harry Wright, aged 60, night superintendent of the Hudson (Mass.) Worsted Co., died at the Marlboro Hospital, there Aug. 6.

Lyman R. Thompson, owner of the Frost Mfg. Co., Portland, Me., and a descendant of one of the first settlers of Plymouth, Mass., died at his summer home at East Sebago, Me., recently.

Andrew E. Greene, aged 77, who had been 40 years with Worumbo Mills, died recently in Lisbon Falls, Me.

Wm. A. Arnold, aged 77, retired owner of Arnold Dye Works, Hawthorne, N. J., died in the Newton, N. J., hospital recently following an operation.

Abraham Pleet, aged 73, president, Yorkshire Worsted Mills, died Aug. 1 at University Hospital, Philadelphia, after a brief illness.

Cotton Digest

THERE is food for thought in the loom census sponsored by the International Federation of Master Cotton Spinners' and Manufacturers' Associations. In three years (1933 to 1936) the total number of looms in the world showed little change—an increase of 10,526. However, the United States showed a loss of 40,181 looms and Great Britain a loss of 83,191. These decreases were off-set by increases in Russia, Japan, China, India, etc. . . . . The moral is clear. Countries such as Great Britain and the United States find it increasingly difficult to compete with living conditions in Russia and the Far East. The only real solution is expansion of domestic outlets for cotton goods.—*Editor.*

National Association at Providence—Annual meeting of National Association of Cotton Manufacturers will be held Oct. 6 and 7 at the Providence-Biltmore Hotel, Providence, R. I. Robert L. Anthony, president of the Rhode Island Textile Association, is chairman of the committee on arrangements. About 500 persons are expected to attend.

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Crop Report Depresses Markets—Cotton-goods prices which began a decline in late spring continued to sink during August, depressed primarily by the raw-cotton situation. Yarn sales and prices were disappointing for the same reason. Basic print cloths dropped another ¾c., sheetings receded ⅞ to 1c., osnaburgs were off over a cent. Mercerized yarn prices were reduced considerably. Spinners seemed unable to stabilize the yarn market. The chief bright spot in the entire situation was elimination of third-shift operation by a number of mills making basic goods. Crop estimate as of Sept. 1 (16,098,000 bales) marked a gain of over 500,000 bales during the month of August.

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Cotton Loan is 9c—Upon agreeing to participate in the 1938 agricultural adjustment program, producers may borrow 9c. lb. on 1937 cotton classing ⅞-in. middling or better, and equivalent amounts on lower qualities. A price-adjustment-payment plan, announced at the same time, authorizes a program for 1937 similar to that of 1935. That is, upon proof of compliance with the 1938 agricultural program, producers who sell 1937 cotton prior to July 1, 1938 will be paid the difference between 12c lb. and the average price of ⅞-in. middling on the ten spot markets on the day of the sale, not to exceed 3c. lb.

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Allot $100,000 For New Uses—An allotment of an additional $100,000 has been made for continuation of work in developing and expanding new uses of cotton, according to a recent announcement of the Agricultural Adjustment Administration. One of the chief new fields of investigation includes the use of fabrics to prevent soil erosion.

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Northern Brazil Crop 24% Larger—The first estimate of 1937 cotton production in northern Brazil is for a crop of 1,005,000 bales—24% larger than last year's crop.

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Georgia Supervisors Meet—Textile Operating Executives of Georgia is scheduled to hold fall meeting Sept. 18 at Georgia Tech, Atlanta. Slashing and weaving subjects are to be considered. George Glenn, superintendent of Pepperell Mfg. Co., Lindale, will lead slashing discussion. W. H. Gibson, Jr., general superintendent of Martha Mills, Thomaston, will conduct weaving session.

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Cotton Standardization Report—A detailed report on "Some Results of Standardization of Cotton Production in One-Variety Communities in Georgia and Alabama," has recently been prepared and released by C. A. McLendon, agronomist, U. S. Department of Agriculture. The report shows that Georgia growers in 1936 participating in the one-variety community plan received $4,462,213.80 extra net profit. Similar results are said to have been noted in Alabama during the same period.

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Philippines "Buy U.S."—The United States retained its position as chief supplier of cotton goods to the Philippine Islands during 1936 and there was a decline in the relative position of Japan, according to a recent report from the Department of Commerce. Of cotton-textile imports totaling 30,535,000 pesos, 13,565,000 pesos came from the U. S. and 10,947,000 pesos from Japan. In 1935, imports from the U. S. were valued at 13,535,000 pesos, and those from Japan at 13,072,000 pesos.

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Cotton Supply and Distribution—The raw-cotton situation, for twelve months ended July 31, according to the last report from the Department of Commerce, is as follows: Ginnings, 12,243,299 bales; net imports, 247,391 bales; net exports, 5,432,668 bales; cotton consumed, 7,944,803 bales; cotton destroyed, 45,000 bales. Stocks on hand totaled 4,497,505 bales as compared with 5,409,389 bales the previous year. Exports aggregated 5,440,000 bales valued at $372,923,000 as compared with 5,973,000 bales valued at $383,537,000 the previous period, a 2.8% decrease in value. Ginnings from the 1937 crop amounted 514,675 bales prior to Aug. 16.

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Cotton Roads Extended—A total of 600 miles of cotton roads are expected to be in use in more than a score of states by the end of this year, according to the Cotton-Textile Institute. This will include approximately 100 miles now under construction.

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U. S. Loses 40,181 Looms—There has been a decrease of 40,181 cotton looms in the United States during the last three years, according to the third International Loom Census recently released by the International Federation of Master Cotton Spinners' and Manufacturers' Associations. The report further shows that the total number of looms in the world, 3,070,395, has changed relatively little despite a decrease in several other countries such as Great Britain which lost 83,191 looms. These decreases have been offset by increases in U.S.S.R., China, Japan, India, etc. There was a total world increase of 10,526 looms.

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Key Cotton Prices with usual comparisons follow:

	Sept. 1, 1937	Aug. 2, 1937	Sept. 1, 1936	Sept. 3, 1935
Spot Cotton, N. Y.	$9.29	$10.65	$11.87	$10.65
Ditto, high previous month	11.35	13.05	12.89	12.00
Ditto, low previous month	9.38	11.18	11.70	10.65
10s hosiery cones	23½	25	24½	26½
10s/2 carded skeins	22	25	24½	27
20s/2 carded peeler warps	32	28	27½	30
60s/2 combed peeler warps	54	59	55	54
60s/2 mercerized cones	72	76	68	70
37 in., 3-yd. drill	8½	9½	8½	9
38½ in., 64 x 60s	5½	6 1/16	5½	6½
36 in., 4-yd. 56 x 60s	6¼	7½	7½	7⅛
Denim, 2.20s	16	16	13	15

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Statistics of particular interest to cotton manufacturers showing July operations and the raw material situation:

	July	June
Spindle activity (% capacity)	121.9	137.0
Spindle activity (millions of spindle hours)	7,665	8,595
Cotton consumed (bales)	583,066	681,394
Cotton exported (bales)	124,312	229,639
Cotton imported (bales)	18,960	35,953

Cotton

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TEXTILE WORLD'S

Wool Digest

AS WE write this, the wool goods market is in a curious seesaw position with raw materials stronger but with finished goods very dull and buyers bearish. The background is this: At the opening of tropicals in July, prices were of course higher than the year previous (with two 10% wage increases and a 15 to 20% raw material rise to cover.) Even though the new prices were about parity with current value, cloth buyers turned cautious. Now, although raw wool is firmer, sellers are getting the jitters, and buyers' bearish tactics might work. . . . . This is not an unheard-of situation. It has existed before. The answer, from the manufacturer's standpoint, is or should be the waiting game. That's not an easy game to play, but it's often a profitable one.—*Editor.*

Election to determine the collective bargaining agency at the Wood and Ayer Mills of the American Woolen Co. was scheduled for Sept. 15 and 16 following conferences between the management and Sidney Hillman, chairman of TWOC. This move may foreshadow acceptance by the big company of an agreement with that CIO union. For the purposes of election, however, the company's 28 plants will be taken up as units. There seems not much doubt that the larger units at least will give TWOC a majority, although TWOC lost the recent election at the Cleveland plant of Cleveland Worsted Mills Co., 955 to 986, but won at Redfern plant 198 to 69. They were conceded the Annevar plant and no election was held.

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TWOC has signed agreements with 27 companies in the wool goods field according to a list issued near the end of last month. These companies employ a total of 9,150 operatives. Only four of them (Princeton, Paragon, Wuskanut and Kent) employ more than 500 workers. TWOC'S research department finds 592 companies in the woolen and worsted industry employing 166,000 workers. About one-half of these workers are employed by 34 companies of which nine companies employ 56,783 workers. To end of August TWOC had signed agreements affecting only about 5% of the industry's total workers.

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Leading employers in the wool goods field, according to TWOC figures, are the following in order of size: American Woolen Co., 23,848 workers; Stevens group, 6,585; Arlington, 5,900; Botany, 4,500; Atlantic, 3,750; Uxbridge, 3,290; Abbot worsted, 3,060; Forstmann, 3,000; Cleveland Worsted, 2,850. These are the nine companies mentioned in the previous paragraph which together employ slightly more than one third of the workers in the industry.

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Wool goods slow—The fabric markets were slow through late August and over Labor Day holiday but broader trade is expected before the end of September. Women's wear buyers are watching early promotions at retail and it is believed many have a fair yardage still to buy. Men's wear factors are showing concern over possible carryovers of spring and summer goods and they are watching the price policies of the larger chain clothiers. Prices are reported firm but sentiment is somewhat unsettled because of the slowness of business and the bearish tactics of buyers. The basic costs of labor and raw materials are not likely to meet reductions and mill men are being urged to out-wait the buyer. In fact raw wool is stronger than it was in June and July and gradual progress of TWOC suggests that the tightening of labor costs is similarly moving upon the industry. The backlog of men's wear orders is set at about 20,000,000 yd.—adequate but considerably less than earlier in the year. Opening of spring, 1938, men's wear lines is expected before Oct. 1.

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Wool growers have had a good season, says Walter K. Porzer, general director of Associated Wool Industries, on his return from a visit to Utah and adjoining States. He found growers generally optimistic, though facing difficulties of bureaucracy in the workings of the Taylor Grazing Act. The fees and conditions for use of range lands are disturbing to them, but in the long run the preservation of these great areas for grazing may be the salvation of the domestic wool raising industry.

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Wool tops ran along steadily until the last week of the month when prices sagged somewhat. Spots were $1.15 in New York until Aug. 20 when they went to $1.14. Trading has been slow, reflecting the conditions of the raw wool and the cloth markets.

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Synthetics and Analysis—Advent of fabrics of miscellaneous constituency ranging from wool through viscose and acetate staple to casein and bast fibers, renders the naming of some fabrics difficult and complicates the matter of labeling and identification.

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Mohair manufacturers are optimistic that the forthcoming 1938 automobiles will consume as much mohair upholstery as ever. Even though flat fabrics are being used more than before it is said that many of them will contain mohair in the yarn blend, while of course the pile fabrics are predominantly mohair. Raw mohair holds near 1937 highs with holders asking 62½¢ for regular and 72½¢ for kid. Spinners want $1.27½ for 2-20s yarn. Increased activity is expected as September progresses.

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More Hair; Less Goats: Government report states that 2% more mohair was produced in 1936 than in 1935; 15,986,000 lb. against 15,634,000. However, this was accomplished by 2% less goats; the number clipped in 1936 being 3,668,000, against 3,735,000. Texas remains the leading State with 84% of the country's production. High production for the last seven years was 1931 with 19,376,000 lbs.

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Wool dresses are the subject of a bulletin released recently by Associated Wool Industries. Fabrics favored are said to be woolen and worsted plaids, sheer wools (crepes and chiffons), fabrics for shirt waist dresses (flannels, alpacas, jerseys, cashmeres, hopsacking, rabbit mixtures and novelty tweeds.

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Australian Commonwealth statistician's estimate for the current wool season now closing, gives the money value of the clip at a little more than £67,500,000. This is equivalent to an average of 16.4d per pound from a production of 975,000,000 lb. It compares with £38,500,000 in 1932–33 when the average per pound was only 8.7d from a production of 1,026,000,000 lb.

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Key wool prices with usual comparisons, follow:

	Sept. 1, 1937	Aug. 2, 1937	Sept. 1, 1936	Sept. 3, 1935
Fine and fine med. territory	$0.97	$0.97	$0.85	$0.68
Ohio ⅜s	.44	.44	.39	.32½
Tops fine 64-66s	1.18	1.18	1.08	.94
average ⅜s	1.05	1.05	.97	.79
high ½	1.00	1.00	.88	.70
Noils, fine	.75	.75	.68	.57
¼	.58	.58	.55	.43½
2-40s 60s wstd yarn	1.80	1.80	1.52½	1.42½
8020 serge	2.27½	2.27½	1.82½	Not quoted

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Current statistics on wool consumption and mill activity:

	July (5 weeks)	June (4 weeks)
Wool consumed, clean equiv.		
Apparel wool, lb.	20,510,000	20,080,000
Carpet wool, lb.	7,905,000	9,512,000
Machinery activity (40-hr. shift)		
Looms (50-in. and wider)	92.5%	112.2%
Carpet looms	62.6%	82.1%
Combs	104.2%	125.9%
Worsted spindles	70.4%	90.5%
Woolen spindles	101.6%	120.2%

Wool

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TEXTILE WORLD'S

Rayon & Silk Digest

SINCE this is rayon's annual "at home" month in TEXTILE WORLD (see page 87), a brief appraisal is in order. The industry presents a stimulating picture of vigorous progress in both the making and selling of synthetics. It is significant that the rayon chemist and the rayon merchandiser alike have refused the temptation to "stay put" which is offered by the market's sold up condition. Better yarns, better merchandising—these are rayon's 1937 keynote and they constitute a healthy basis for 1938 planning.—*Editor.*

"Delayed Seasonal Lull" in Rayon—A let-up in demand which was rather aptly characterized by one sales executive as a "delayed seasonal lull" was evident throughout the rayon yarn industry during recent weeks. It was attributed in part to the silk-rayon strike in New Jersey and Pennsylvania. The slackening permitted leading yarn firms to catch up with orders; a few even accumulated some stock. Generally the outlook was regarded as satisfactory.

•

Silk Prices Weaken—Despite such inflationary influences as the Sino-Japanese war, raw silk prices showed appreciable weakness during the month. Commodity Exchange, New York, quoted crack double extra 13-15 white 78% at $1.89 on July 26 and at $1.81½ on Aug. 20. The market was jumpy in the second half of August with considerable speculation apparent; reports, as yet unconfirmed, that Japan would use its silk transports for war service, added further uncertainty but failed to give prices a higher peg.

•

Key rayon prices and statistics follow:

Prices	Sept. 1 1937	Aug. 1 1937	Sept. 1936	Sept. 3 1935
Viscose process				
75 denier (18-30 fils.)	$0.93	$0.93	$0.90	$0.87
100 denier (40 fils.)	.82	.82	.79	.76
150 denier (40 fils.)	.63	.63	.60	.57
Acetate process				
150 denier	.63	.63	.60	.60
Cupra. process				
150 denier (112 fils.)	.68	.68	.65	.62
Rayon staple				
1½, 3 and 5½ denier	.28	.28	.28	Not quoted

*Indices of deliveries** Month	Aug.	July	June
In year 1937	530	511	518
In year 1936	633	614	498

* "Rayon Organon," exclusive of Acetate. Daily average, 1923-25 = 100.

•

Key silk prices and statistics follow:

Prices	Sept. 1 1937	Aug. 2 1937	Sept. 1 1936	Sept. 3 1935
Crack XX 13/15 white 78%	$1.78½	$1.80	$1.66	$1.87
Tram, 5thd Japan 85%	2.75	2.75	2.34	2.67½
Tram Crack XX 78%	2.43	2.43	2.25	2.47½
60s-2, spun silk	3.15	3.15	2.95	2.75

Statistics	Imports	Approx. Deliveries	Stocks at Warehouses
Aug. 1937	36,246	33,557	44,183
July 1937	27,337	31,399	41,494
June 1937	40,037	35,783	45,556

•

F.T.C. Calls Rayon Hearing—A trade practice conference to formulate rules for designating and describing synthetic fibers, yarns and fabrics, will be held in New York on or about Sept. 16, the Federal Trade Commission announced Sept. 3. It was reported later that producers might hold preliminary meetings which might delay the conference.

•

All Set For Silk Parade!—Thanks to vigorous promotion, including a series of merchandising forums at the Waldorf-Astoria Hotel, New York, interest in the Silk Parade this year is unusually keen. The Parade, held by the International Silk Guild, runs through the week of Sept. 20. More than 15,000 retail stores serving 12,000,000 families are participating and have stocked up substantially with silk merchandise, anticipating a strong consumer demand. Stores are using radio actively to promote the event.

•

Rayon Fabric Deliveries — Rayon woven cloth deliveries in July 1937 were slightly below those of June and also slightly below the month of July, 1936, according to monthly figures of the National Federation of Textiles and the National Rayon Weavers Association. Key figures for the month follow:

1934 = 100	July 1936	June 1937	July 1937
Taffetas, Twills, Linings and Other Staples	250	251	254
Dress Goods, Novelties, and Other Fancies	99	97	83
Total,	151	154	148

Rayon & Silk

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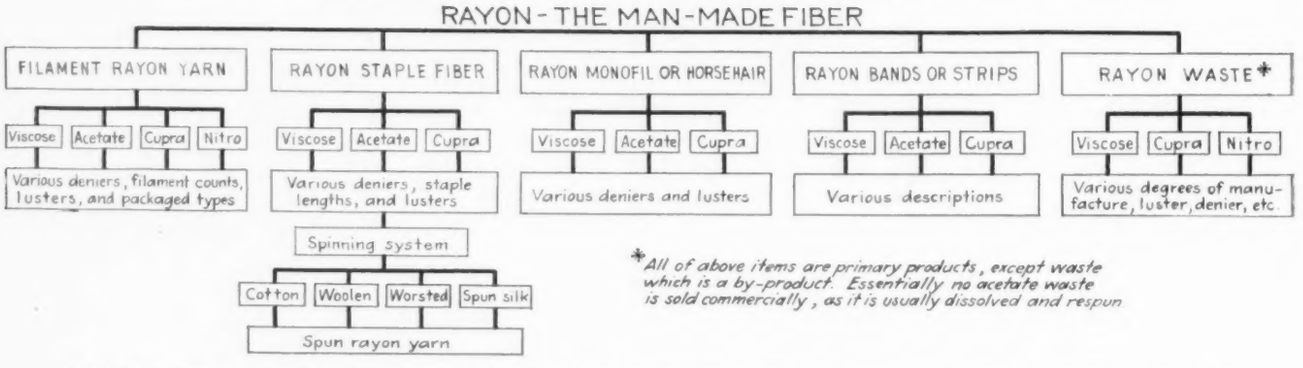
A CONCEPT OF RAYON NOMENCLATURE



With the numerous current discussions of fiber identification, and especially their reference to rayon, the diagram above has been drawn to show the prevalent concept of coverage of the word "rayon." This diagram follows the official definition of rayon given by the American Society for Testing Materials (ASTM) and is accepted by a great majority of the American rayon producers. It has been adopted officially by essentially all governments in whose countries rayon is made. Originally sponsored by the National Retail Dry Goods Association, the generic use of the name "rayon" has recently been re-affirmed by such agencies as the Better Business Bureau; Sears Roebuck & Co.; John Wanamaker; Bloomingdale's; B. Altman & Co.; and Belding Heminway Co. among others. This table is offered as a clear concept of this generic use of the word "rayon" as applied to all the man-made textile fibers.

TEXTILE WORLD'S

Knit Goods Digest

THE "battle of the machines" is getting into the news again—this time in the outerwear field. The loom is encroaching on the markets of the knitting machine in swimsuits and woven polo-shirts, to cite two instances. It is foolish to tell an outerwear man not to worry about these tendencies, because everyone worries about inroads of competition. However, there is no ground for despair. This is an old battle-ground, and probably always will be one. To hold its own, either side must keep alert in the diversification of its product. What the outerwear industry may lose in swimsuits and polo-shirts, for example, it might at least partially regain in jerseys, coatings, etc. The promotion sense which this industry has displayed in recent years will carry it through this battle, as it has through others in the past.—*Editor.*

N. Y. Hosiery Convention Oct. 14 and 15—Preliminary plans for the annual fall conference of the hosiery industry, to be held Oct. 14 and 15 in New York were announced last month by the National Association of Hosiery Manufacturers. The N. Y. meeting takes the place of the proposed cruise-conference to Bermuda which was cancelled because the favorable response from mills, while numerous, was not sufficiently representative of the industry. The October convention will comprise four half-day sessions, each devoted to a specific topic.

•

Apex Mill Reopens—Tied up since May by a strike, Apex Hosiery Mills, Philadelphia, reopened Aug. 19, and the company started the slow task of getting back to normal production. F. Elwood Struve, general manager, said the mill would not be on full time operation until the end of the year. For the preliminary opening tasks 150 knitters returned to work.

•

Cotton Uncertainty Slows Underwear—Uncertainty as to the course of the raw cotton market slowed up buying of men's heavyweight cotton underwear in recent weeks; mills generally had caught up with deliveries and were disposed to put brakes on production pending some improvement in buying this month.

•

Orchids for Mrs. Boltz—Warm praise of Mrs. Maud I. Boltz, president of Jacob Boltz Knitting Mill, Pottsville, Pa., is contained in an article in the current *Institute News*, organ of the Underwear Institute. Mrs Bolz, one of the few women chief executives in the underwear industry, "has made a signal success in the field," it is stated. Recently Mrs. Bolz put through an expansion program at the mill materially enlarging its capacity.

•

Fall Hosiery Buying Backward—At the beginning of September, full-fashioned hosiery orders for fall were still backward, the reason being that manufacturers are disinclined to book further orders at present prices.

•

Underwear Lighting Survey Completed—Results of the survey of lighting conditions in underwear mills which was recently completed by the Underwear Institute now are being distributed to the mills which supplied data. It is understood that the study was in the nature of a preliminary step to further research which will be conducted by the Institute in collaboration with the Society of Illuminating Engineers.

•

Hosiery Shipments Easier—Hosiery shipments dropped 5.6% in July, 1937, against June, according to the National Association of Hosiery Manufacturers, the comparative figures being: June—9,936,271 doz. pr. against July—9,380,520 doz. pr. It was pointed out that in women's full-fashioned the drop was less than seasonal while seamless showed a more than seasonal drop.

•

Southern Hosiery Meeting Has Been Held—Important problems now confronting the Southern hosiery industry were discussed at the annual meeting of the Southern Hosiery Manufacturers Association, Sept. 10 and 11 at Asheville, N. C. Speakers included Earl Constantine, managing director, National Association of Hosiery Manufacturers, and Dr. Julian S. Miller, editor of The *Charlotte* (N. C.) *Observer*. The Elastic Patent Co.'s royalty claims on its method of knitting a seamless stocking with elastic tops were discussed at a special session.

•

Feld-Crawford Inquiry—An inquiry by the Underwear Institute as to the policy of underwear mills regarding the Feld-Crawford Act on retail prices of brands, disclosed that few were stressing the law while some used it to oppose the store sale of their garments as "loss leaders."

•

Sweater Imports Rising?—Reports that there has been a substantial rise in imports of high quality lines of women's sweaters, coming chiefly from Austria and Great Britain, are causing some concern in the New York market. Domestic knitters who compete in this field claim that jobbers have been doing an abnormally large business in imported sweater merchandise of the better qualities.

•

Outerwear Group Discusses Cruise—Following the proposal of the hosiery manufacturers, which later was cancelled, for a convention-cruise to Bermuda, the *Outerwear Times*, organ of the National Knitted Outerwear Association, takes up the idea in its current issue. Writing in half-humorous vein, the editor comments that the outerwear trade might well consider such a project as a substitute for its annual spring meeting in New York.

•

Charge Union Blocks Sale—Hosiery manufacturers are following with interest the suit of Diamond Full-Fashioned Hosiery Co., High Point, N. C., for an injunction against William Leader, of the American Federation of Hosiery Workers. Diamond charges that union pickets at Vogue Silk Hosiery Co., Philadelphia, have prevented Vogue from shipping equipment recently bought by Diamond, to the latter firm's High Point mill.

•

Trend to Woven Polo Shirts?—The trend to use of woven fabrics in making polo shirts and other sweater types which was quite marked last month is causing some concern among knitters. Woven and knit fabrics have been combined in garments for some time but now fashion leans to more woven fabric and less knit cloth. Trade leaders say the style can be answered only by new and more attractive styles in knitted fabrics.

•

British vs. American Hosiery Mills—Hosiery mill layout, equipment and finishing in the U. S. are superior to those in Great Britain, but the British are ahead in working fabrics and in hand detail of loop finishing, declared Roger W. Whitman, vice-president, American Hosiery Co., who returned recently from an extended trip through English and Scottish textile centers.

Knit Goods

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Processing Digest

CERTAIN groups of ready-to-wear buyers complain that some crush-resist velvets emit objectionable odors when subject to humidity or perspiration. While this is far from being a new problem to the textile chemist, the current protest from important customer sources demands that further attention be given the matter with a view to eliminating the fault. One difficulty is said to be the "capricious" nature of these odors. . . . The crush-resist process has been a real boon to velvet sales during the last year. Past experience gives us confidence that the chemist's ability will enable the industry to hold those gains.—*Editor.*

Chemical Show Dec. 6-11—A slogan contest with prizes totaling $300 will be a feature of the 16th Exposition of Chemical Industries to be held Dec. 6-11 at Grand Central Palace, New York. The prizes will be awarded for the best brief descriptions of the aims and benefits of the chemical and chemical process industries. Reservations for the show are ahead of last year, and point to an unusually varied display of chemical products, it is stated.

•

Southern Chemists Outing—The South Central Section of the American Association of Textile Chemists & Colorists held its annual summer outing at the Lookout Mountain Hotel, near Chattanooga, Tenn. More than 200 persons were present. Officials of the outing were R. S. Wheeler, chairman, Harold Schroeder, aide, and Robert Cowan, secretary. William Kelly, Jr., of Burkhart-Schier Chemical Co., was in charge of publicity. Walter Hadley, of Standard-Coosa-Thatcher Co., is chairman of the section.

•

Association Party Sept. 19—The annual family party of the National Association of Textile Dyers and Finishers will be held at the Tercentenary Shore Dinner, Hall, Conimicut Point, Shawomet, R. I., Sept. 19.

•

Screen Engravers Plan Code—Plans for the formation of a trade practice code to curb unfair competition in the screen-making industry were discussed by the recently organized Master Screen Engravers Guild at a meeting last month in New York. D. C. McAllister, executive secretary of the guild, presided; a committee was appointed to draft a constitution, by-laws and a code of fair practices. Among those represented at the meeting were Fred Menzer, Excello Stencil Service, Artistic Engraving Co., Pantograve Co., American Engraving Co., and Service Studio.

•

Johnson Plan's Fate in Doubt—The fate of the revised plan by Gen. Hugh S. Johnson to stabilize the silk- and rayon-printing industry remained in doubt when September opened. It is understood that the plan, as rewritten, modifies the labor tie-up and features establishment of a trade association with headquarters in Paterson, N. J., which would serve as a central bill collecting agency, a credit bureau and a general trade body. Strong objection to the cost of the plan, reported to be $240,000 annually for three years, has arisen in some quarters. As we go to press, it is reported that General Johnson will not become "czar" of the silk printing industry. Instead, the printers have formed a new association, the Rayon & Silk Printing Association, which includes both large and small companies, to put into effect certain of the measures recommended in the Johnson report. Trustees of the association include: Hyman Haber, Michael A. Clemons, Jules Jeandros, Albert E. McLuckie, G. Mortimer Reader, Charles Blount and John R. Ellingworth. Offices of the association will be in the Fair Lawn Trust Co. Bldg., Fair Lawn, N. J.

•

The September issue of *Textile Research,* official organ of the Institute, contains an "honor list" of the 46 financial sponsors of the drying research. A total of 50 sponsors is needed to complete the financing of the study for its first year; but there is no limit to the number of cooperaors, and, should sufficient additional funds be subscribed, progress of the work may be aided materially.

•

Print Production Rises—Print-goods production by finishers rose from 88,294,000 yd. in June 1936, to 99,909,000 yd. in June 1937, according to data compiled by the National Association of Finishers of Textile Fabrics and released by the Department of Commerce. However, stocks in finishers' hands rose from 184,649,000 yd. in July 31, 1936, to 278,425,000 yd. on July 31, 1937.

•

Spun Rayon Sanforizing Progresses Abroad—Europe is making rapid progress in Sanforizing spun rayons, this being possible through impregnation with synthetic resin, John C. Turrell, head of the Sanforizing Division, Cluett, Peabody & Co., stated on return from a trip abroad. He added that impregnation with synthetic resin is not only vital to the Sanforizing of spun rayons but also enhances their appearance and gives them a better hand.

•

Neva-Wet Identification Plan—Plans for testing fabrics and then identifying them as to character and construction were announced last month by Neva-Wet Corp. The firm will open a New York laboratory under supervision of U. S. Testing Co., where all fabrics handled by the company will be tested and then identified by tags telling exactly the fiber percentages of each piece of goods, it was stated by S. Howard Lefkowitz, president of the company.

•

Dyeing a Manufacturing Process—Dyeing of imported silk piece goods in the U. S. for exportation is a manufacturing process covered by the drawback provision, Section 313, U. S. Tariff Act, it has been held by James H. Moyke, Commissioner of Customs, in a Customs Bureau ruling. He further held that such consignments may not be entered under six months' bond without duty payment for alteration.

•

Washable Chintz Available—The Cotton-Textile Institute announces that washable glazed chintz has been developed to a commercial point and will be actively promoted through to the consumer this fall. The new fabric will be non-shrinkable and will be available in a wide range of colors.

•

Pledge by Printers—Edmund Wright, executive director, Textile Converters Association of America, announced that eighteen screen-printing and embossing establishments have agreed in writing to refrain from serving both converters and the garment trade at the same time.

•

Drying Research—An outline of the purposes, program, organization, administration, and financing of the cooperative study of textile drying under the auspices of the United States Institute for Textile Research (65 Franklin St., Boston, Mass.) at the National Bureau of Standards has been published in a 16-page booklet. This booklet explains how the progress reports and other services of the study may be obtained, and also contains a description of the Institute's cooperative research plan.

Processing

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Mill News

Cotton Mill News

California Cotton Mills, Canebrake plant, Uniontown, Ala., have installed new long-draft spinning equipment, numbering 8,160 spindles, and long-draft slubbers.

Acme Spinning Mfg. Co., 1235 South Lorena St., Los Angeles, Calif., has filed notice of organization to manufacture cotton goods. Company is headed by Henry L. Routh, 1240 West Newmark Ave., Monterey Park, Calif.

Consolidated Textile Corp., Union Division, La Fayette, Ga., has awarded the contract to C. M. Guest & Sons, Anderson, S. C., to repair and repaint dwellings of the village, preparatory to reopening the mill, recently purchased by the Exposition Mills of Atlanta, Ga.

Consolidated Textile Corp. of Georgia, Pelham, Ga., sale to Otto F. Field of Atlanta, Ga., for $40,000 has been approved by Federal Judge Henry W. Goddard.

Royston (Ga.) Spinning Co., has completed installation of $50,000 worth of additional machinery.

Arnall Mills, Sargent, Ga., are installing 5,500 spindles.

Linen Thread Co's. West Kennebunk, Me., plant has been sold to the Kennebunk Electric Light Commission for $20,000.

American Linen Mills, Fall River, Mass.—Property of this company has been acquired by Bailey & Grant Co., Fall River, oil and petroleum products.

Merrimack Mfg Co., Lowell, Mass. The report, published in this department in July, to the effect that a part of the Merrimack plant had been taken over by General Motors Corp. for manufacture of seat covers is wholly without foundation in fact and arose from an article published in the local newspapers, according to the company.

Northern Mfg. Co., Inc., 64 Conduit St., New Bedford, Mass., has been organized with capital of 100 shares of stock, to operate a local mill on cotton and woolen specialties. Milton Nurenberg is president; Irving Nurenberg, treasurer.

Taber Mill, New Bedford, Mass., has been placed in hands of John H. Backus as 77B trustee; hearing set for Sept. 27.

J. W. Sanders Cotton Mill, plant No. 3, Meridian, Miss., will install 68 additional looms and later install more spindles.

Amoskeag Industries, Inc., which acquired last October for $5,000,000 the assets of the liquidated Amoskeag Mfg. Co., Manchester, N. H., recently declared a 125% dividend to its stockholders. The payment is to be $25 a share in cash and 100% in five-year notes bearing interest at 6%.

Harmony Mills, Cohoes, N. Y., including seven manufacturing buildings and more than 6 acres of land, were sold at auction on Aug. 26, for $19,850 in 6 parcels.

Johns-Manville Corp., New York, N. Y., will take bids soon for construction of new plant on 50-acre tract of land at Alameda Ave., and 283rd. St., Los Angeles, Calif. Project will cost over $750,000, with equipment. Stone & Webster Engineering Corp., Boston, Mass., is engineer; Albert C. Martin, Higgins Bldg., Los Angeles, is consulting architect.

Robinson Yarn Mill, Dallas, N. C., has installed 3,000 additional spindles.

Vamoco Mills Co., Franklinton, N. C., recently organized, plans operation of a local cotton mill. New company is headed by Walter Scott and Charles Watkins, both of Franklinton.

Glen Raven (N. C.) Cotton Mills are erecting a brick, one-story, weave shed at cost of $18,000.

Jackson Mills, No. 3, High Shoals, N. C., have work nearing completion on new hydroelectric power plant, for which contract was let to the Lee Construction Co., Charlotte, N. C. It will have a capacity of 2,500-hp.

Wennonah Cotton Mills, Lexington, N. C., has just completed the revamping of its machinery through the installation of a number of wide dobby looms. The mill is now on complete novelty production, making draperies, slack cloths and seat covers.

Tolar Cotton Co., Lumber Bridge (Robeson County), N. C., recently organized with capital of $50,000, plans operation of a cotton mill. New company is headed by F. L. Tolar and W. E. McGoogan.

Mooresville (N. C.) Cotton Mills are installing 35 new Monel metal wire-screen beams, recently purchased from the Gaston County Dyeing Machine Co., Stanley, N. C.

Sanford (N. C.) Cotton Mills will construct a second story on the addition completed last April. Installation of 3,000 spindles and 100 looms is planned.

Lydia Cotton Mills, Clinton, S. C., have begun extensions and improvements in local mill village, to include erection of 11 additional dwellings, construction of a playground and other work. Later in the fall, the company will begin work on another series of about 40 dwellings.

Darlington (S C.) Mfg. Co., has filed a petition to reorganize under 77B.

Springs Cotton Mills, Fort Mill, S. C., have begun the construction of a three-story addition to the No. 1 plant there. It will measure 100 x 150 ft. and will be used to house looms and cloth room equipment.

Southern Weaving Co., Greenville, S. C., has awarded general contract to the Gallivan Construction Co., Greenville, for new one-story addition, to be used primarily for office. Cost about $22,000.

Mathews Cotton Mill, Greenwood, S. C., is constructing a one story addition at cost of $65,000.

Drayton Mills, Spartanburg, S. C., have completed reorganization and have been granted a final discharge from supervision of the Federal Court.

Sumter (S. C.) Spread Co., capitalized at $7,500, has been formed. George G. Warren is president; Mabel P. Warren, secretary-treasurer.

Winnsboro (S. C.) Mills have awarded general contract to Batson-Cook Co., West Point, Ga., for one-story addition to Stark Mills, Hogansville, Ga., to be used primarily for warehouse. Same contractor also has received an award for a number of dwellings at Hogansville.

Brenham (Tex.) Cotton Mills have been sold to Bonham Cotton Mills and will be reopened after five year shutdown.

Guadalupe Valley Cotton Mills, Cuero, Tex., has plans for one-story addition, 140 x 145 ft. Cost close to $65,000. J. M. Marriott, Frost Bldg., San Antonio, Tex., is architect.

Mexia (Tex.) Textile Mills have installed one-process picking and new long draft spinning.

Dominion Yarns Ltd., Welland, Ont., Canada, is erecting an addition to be used for cotton spinning providing a 15% increase in production. About $50,000 will be spent. New machinery includes 1,000 long draft spindles, 11 sets of cards, and additional winding and coning machinery.

Dominion Textile Ltd., Sherbrooke, Que., will install 15,000 cotton spindles of the latest type.

Earnings Statements

The following summarizes recent mill financial statements showing 1937 net earnings compared with similar periods a year previous. Parentheses following company name states for what period; minus signs mean loss instead of profit.

	1937	Previous year
Bigelow-Sanford Co. (1st half)	$1,286,179	$497,795
American Hair & Felt Co. (1st half)	294,458	227,499
Franklin Rayon Corp. (1st half)	149,113	—3,046
Sidney Blumenthal & Co. (2d quar.)	—86,494	—59,595
Duplan Silk Corp. (year to May 31)	697,667	417,348
Celanese Corp. (2d quarter)	1,695,279	.....
Real Silk Hosiery Mills (1st half)	—50,733	—66,771
Interstate Hosiery Mills (1st half)	293,642	182,739
United Hosiery Mills (year ended June 30)	19,296	—34,380
Gotham Silk Hosiery Co. (1st half)	190,725	150,999
Van Raalte Co. (1st half)	460,582	420,414
Julius Kayser (year ended June 30)	917,986	645,842
Munsingwear, Inc. (1st half)	62,400	.....
Raybestos-Manhattan, Inc. (1st half)	1,510,642	989,122
Textiles, Inc. (1st half)	293,842	.....
Pacific Mills (1st half)	1,097,537	59,538
Pepperell Mfg. Co. (year ended June 30)	2,104,000	1,121,000

Wool Mill News

Sidney Blumenthal & Co., Inc., Shelton, Conn., have begun superstructure for one-story addition, 100 x 200 ft., for which general contract recently was let to the Turner Construction Co., New York, N. Y. It will be equipped as a dye house and is estimated to cost close to $150,000, including equipment. J. E. Sirrine & Co., Greenville, S. C., are architects.

Sheuerman Bros., Inc., (Capital City Woolen Mills) Des Moines, Iowa, plant has been purchased by Reconstruction Finance Corp. in foreclosure of mortgage, and leased to the Shenerman firm with a repurchase option.

Lisbon (Me.) Spinning Mill is being purchased by the Bonafide Mills, Winthrop, Me., manufacturers of linoleum.

American Woolen Co., Inc., Lawrence, Mass., has awarded general contract to Arthur N. Olive, Boston, Mass., for three-story addition to its Ayer Mill, 70 x 85 ft., estimated to cost close to $85,000.

Tiffany Woolen Mill, Perryville, Mass., will be liquidated Sept. 30.

Elmvale Worsted Co., Pittsfield, Mass., has arranged for lease of the former local mill of the S. N. & C. R. Mfg. Co., totaling about 100,000 sq. ft. of floor space.

Monmouth Rug Mill, Englishtown, N. J., has been acquired by Harold H. Baynton, heretofore assistant superintendent at mill of A. & M. Karagheusian, Inc., Freehold, N. J., and associates. Improvements will be made, including installation of about 28 additional looms.

National Worsted Mills, Falconer, N. Y., has been closed indefinitely because of "intolerable labor conditions."

Glenside Woolen Mills, Skaneateles Falls, N. Y., operating plants in Syracuse, N. Y., and New London, Conn., has filed a petition to reorganize under section 77B. A similar petition was filed by Onondaga Textile Mills, a subsidiary.

Dresden (Ohio) Woolen Mills, Inc., have been chartered with capital of $50,000 to operate a local mill. Company is represented by W. I. Rowland, 1 East Broad St., Columbus, Ohio, attorney.

Newberg, Ore.—Thomas G. Baron, formerly head of the **Baron Woolen Mills, Inc.,** Brigham, Utah, has negotiations under way with the Newberg Chamber of Commerce for suitable local site for a proposed new woolen mill.

River Mills, Inc., Woonsocket, R. I., will soon begin operations in one of the former mills of the Firestone Tire & Rubber Co., Globe St., Fall River, Mass., recently secured under a five-year lease, with option to purchase. It will be operated as a branch of the Woonsocket mill.

Winchester (Va.) Woolen Co., Inc., is considering construction of a new power house at mill to cost $30,000.

Charlottesville (Va.) Woolen Mills have plans nearing completion for extensions and improvements in mill, including expansion in dye house. Power house at mill will be enlarged and additional facilities installed, including a 220-hp. high-pressure water-tube boiler unit from Combustion Engineering Co., New York. Bryan & Terhune, New York, are engineers.

Rayon & Silk Mill News

Aspinook Co., Jewett City, Conn.—Directors propose liquidation because of labor troubles.

Cheney Bros., Manchester, Conn., will sell 250 tenement houses.

Leiss & Sussman Velvet Mfg. Co., Willimantic, Conn., plans erection of a new building to meet increased demand; will employ about 150 additional operatives.

Union, Miss.—Town Council and a committee of local citizens have secured permission to arrange a bond issue of $35,000 for proposed one-story mill, about 20,000 sq. ft. of floor space, to be occupied under lease as a silk throwing mill by a company whose name is temporarily withheld.

ADVERTISING PAGES REMOVED

Mill News

Colonial Throwing Co., Paterson, N. J., will replace recent fire damage at its mill reported at close to $13,000.

Ballard Silk Co., Inc., Binghamton, N. Y., has filed a voluntary petition in bankruptcy; liabilities, $38,814 and assets, $40,371.

C. K. Eagle & Co., Inc., New York, must file its 77B reorganization plan by Oct. 11. Company has sold its Kulpmont, Pa., plant to Kahn-Nack Mills which will operate it. The Eagle Company is also planning sale of its Rock Street plant in Shamokin, Pa.

Susquehanna Silk Mills, New York, has been discharged from 77B proceedings, the reorganization having been completed.

American Enka Corp., Enka, N. C., is building a filter plant and spray pond at the cost of about $50,000. Reed & Abee, Inc., Asheville, N. C. is constructing the plant.

Industrial Rayon Corp., Cleveland, Ohio, has begun work on new multi-unit mill near Painesville, Ohio, for which general contract recently was awarded to the Hunkin-Conkey Construction Co., Cleveland. Award for structural steel framing has been let to the Bethlehem Steel Corp., Bethlehem, Pa.; and for installation of an automatic sprinkler system to the Power Piping Corp., Pittsburgh, Pa. Entire project will cost over $3,500,000. Wilbur Watson & Associates, Cleveland, are architects and engineers.

Jno. Dunlop's Sons, Inc., Olyphant, Pa.—Local property of this company at Main St. and Lincoln Ave., was sold recently at public liquidation sale.

Wellwood-Murfreesboro Silk Mills, Inc., and the **Wellwood Rayon Mills**, both of Murfreesboro, Tenn., have been merged. The Wellwood-Crossville Silk Throwsters, Inc., of Crossville, Tenn., and the Wellwood-Sparta Silk Mills, Inc., at Sparta, Tenn., have been discontinued and dismantled.

Viscose Corp. of Virginia, Roanoke, Va., has awarded contract to the Virginia Bridge Co., Roanoke, for structural steel framing for new mill at Front Royal, Va., previously referred to. Excavation for main plant 400x2,000 ft. has begun. Foundations for two supply buildings 100x200 have been completed. Production is scheduled to start January, 1939. Wark & Co., Philadelphia, Pa., is general contractor.

Courtaulds (Canada) Ltd., Cornwall, Ont., plans expansion program which calls for expenditure of $3,000,000 on a modern building and necessary machinery and equipment. Contract for construction has been awarded to the Foundation Co. of Canada, Ltd., and same will be ready for use at the end of the present year.

Knitting Mill News

Alabama Textile Mill, Abbeville, Ala., has begun superstructure for new one-story knitting mill, estimated to cost close to $45,000. Company was organized recently by interests at Eufaula, Ala., and is headed by Hugh Stokes.

Anniston (Ala.) **Yarn Mills'** controlling stock is now owned by the Broadalbin (N. Y.) Knitting Mills.

Commerce (Ga.) **Mfg. Co.**, recently organized to manufacture hosiery, has completed plans for new one-story knitting mill, estimated to cost about $50,000 Erection contract has been let to E. M. Williams, Monroe, Ga. C. W. Moon, Jr., is president of company.

Maywood Silk Hosiery Mills, Inc., Cordele, Ga., formerly the Crisp Hosiery Mills, have begun expansion and improvements at mill, including installation of five new full-fashioned machines.

Owen Osborne, Inc., Gainesville, Ga., has approved plans for new one-story addition, totaling about 4,000 sq. ft. of floor space, and will begin work at early date. Additional equipment will be installed. Estimated cost over $25,000, with machinery.

National Silk Hosiery Mills, Inc., Indianapolis, Ind.; have taken out a permit for one-story addition at North Davidson and Michigan Sts.

Bethlehem Knitting Mills, Chicopee, Mass., have filed a petition to reorganize under Section 77B.

Propper-McCallum Hosiery Co., Northampton, Mass., had final hearing on reorganization plan Aug. 24 and it is expected to go into effect Sept. 24. It sets up a five-man voting trust to run the company.

Hurley, Miss.—Board of Supervisors has plans nearing completion for local knitting mill, to be occupied by a company whose name is temporarily withheld, under long-term lease. New mill is reported to cost over $60,000.

Jackson County Mills, Inc., Pascagoula, Miss., lately organized as an interest of Peterzell Brothers, Philadelphia, Pa., have begun superstructure for new one-story mill, totaling about 60,000 sq. ft. of floor space, for the manufacture of woolen knit goods. New mill will cost over $100,000 with equipment. Krouse & Brasfield, Meridian, Miss., are architects.

Maywebb Hosiery Mill, Inc., Meridian, Miss., is adding a third floor to its two-story mill.

Knit Glove Corp., New York, N. Y., has been chartered with capital of $20,000, to operate a knitting mill in this vicinity. New company is represented by Sampson & Elegeant, 1441 Broadway, attorneys.

Fancy Knitters, Inc., Philmont, N. Y., have been incorporated with capital of 100 shares of stock, to operate a local mill. New company is represented by Samuel S. Ferris, 403 Warren St., Hudson, N. Y., attorney.

Utica (N. Y.) **Knitting Co.**, has taken over the mill and business of the **Clayville** (N. Y.) **Knitting Co.**, and will continue operations as a new branch mill. This will make the ninth mill of the purchasing company. George Coffee will continue as superintendent at the Clayville plant.

Standard Hosiery Mills, Alamance, N. C., have begun construction of a modern finishing plant.

Bossong Hosiery Mills, Inc., Asheboro, N. C., have begun superstructure for new addition to mill, 109 x 140 ft., for which general contract recently was let to the Southeastern Construction Co., Charlotte, N. C.; an award for plumbing installation has been made to the Albemarle (N. C.) Plumbing & Heating Co. Cost close to $100,000 with equipment. Irving M. Fenichel, New York, N. Y., is architect.

Priestly Knit Goods Co., Charlotte, N. C., recently organized with capital of $25,000, plans early operation of a local mill. New company is headed by J. S. Passman and H. E. Cohen, 517 South Tryon St., Charlotte.

Juvenile Hosiery Mills, Inc., Greensboro, N. C., have completed construction of a one-story addition, 65 x 90 ft.

Nu-Silk Hosiery Mills, Hickory, N. C.—Karl Stevens, Hickory, has been appointed temporary receiver for this company. Wade N. Bowman heads the organization.

Lincoln Hosiery Mills, Inc., Lincolnton, N. C., recently organized, are taking over local property and plan early operation of a new mill. New company is headed by L. W. Gleeson, High Point, N. C., president; Frank Arnold, vice-president; and T. N. James, secretary and treasurer.

Marvin Hosiery Mill, Lincolnton, N. C., has been chartered and will manufacture and sell knitted goods under an authorized capital stock of $50,000, with $14,500 subscribed by L. W. Greeson, A. F. Arnold, T. N. James and others of Lincolnton.

Monroe (N. C.) **Full-Fashioned Hosiery Co.** is building a 105 x 107 ft. plant to employ 150.

Renfro Hosiery Mills Co., Mt. Airy, N. C. has absorbed through merger Argon Hosiery Mills and Piedmont Mfg. Co., of the same city. Officers elected, effective July 1, are O. K. Merritt, president, W. E. Merritt, Jr., vice-president and treasurer, Hugh L. Merritt, secretary, Robert Smith, assistant treasurer, and Frank Sydnor, assistant secretary.

Excella Hosiery Mills, Inc., Stanfield, N. C., recently organized with capital of $100,000, is headed by Brooks Jerome, treasurer of Stanfield (N. C.) Hosiery Mills, Inc.

Hanes Hosiery Mills Co., Winston-Salem, N. C., is completing construction of a two-story addition, 100 x 190 ft. New unit will represent an investment of about $75,000.

Triumph Hosiery Mills, York, Pa., awarded contract to Dietz A. Smith, local contractor, for construction of a 1-story and basement, 26 x 30 ft., office addition to its plant.

Rockledge Mfg. Co., Woonsocket, R. I., newly organized, has begun experimental production.

United Hosiery Mills, Chattanooga, Tenn., has sold 92 dwellings to operatives of the company.

Englewood, Tenn.—Englewood Citizens Corp., headed by S. N. Land and H. D. Reynolds, has superstructure under way on a one-story building, to be leased to a hosiery manufacturer.

Lynchburg (Va.) **Hosiery Mills** have moved all of the looping and dyeing machinery to its new 50 x 140 ft. on Fort Avenue.

Sale Knitting Co., Inc., Martinsville, Va., recently organized with capital of $250,000, is arranging for early operation of a local underwear mill. E. A. Sale heads the new company.

Processing Plant News

Davenport Process Co., Greenwich, Conn., recently organized, has taken over the former local mill of the North Mianus Woolen Mills and will occupy for a new dyeing and finishing mill.

Pond Lily Co., New Haven, Conn., has awarded general contract to United Building Co., West Haven, Conn., for one-story addition to mill on Whalley Ave., 104 x 185 ft., including improvements in present plant. Cost close to $60,000.

Thomaston (Ga.) **Bleachery** has begun the construction of a four-story reinforced concrete warehouse, 100 x 100 ft., to cost $75,000. The Adams Construction Co. of Atlanta, Ga., has the contract.

Joseph Bancroft & Sons Co., Rockford, Del., has a plan for recapitalization to improve position of those owed accrued dividends on the preferred.

Lawrence (Mass.) **Dye Works** is in liquidation and Roy H. Bradford, 161 Devonshire St., Boston, is liquidating agent for the machinery.

Clark Dye & Print Works, Inc., Paterson, N. J., have been formed with capital of 1000 shares of stock, to operate a local textile dye and print mill; represented by Emanuel Shavick, 140 Market St., Paterson, attorney.

E. & W. Dyeing Corp. has moved from Brooklyn, N. Y., to the property at Paterson, N. J., formerly occupied by P Garino & Son.

Foremost Piece Dye Works, Paterson, N. J., headed by W. T. Murphy, has renovated the former Imhoff-Pailliard Dye Works plant and is operating near capacity of 200 pieces daily.

Globe Skein Dyeing Co., Paterson, N. J., was placed in hands of W. V. Rosenkrans as receiver.

Strengs Piece Dye Works old plant at Paterson, N. J., has been transferred from Garfield Piece Dye Works to Van Vlaanderen Machine Co.

Valley Dye & Print Works, Inc., Paterson, N. J., recently organized with capital of 1,000 shares of stock, plans early operation of a local dyeing and printing mill; represented by Meyer W. Stein, 64 Hamilton St., Paterson, attorney.

William Enzensperger, College Point, L. I., N. Y., has leased the former textile dyeing mill of Mock, Judson, Voehringer Co., Inc., Thirty-sixth Ave. and Thirty-seventh St., Long Island City, N. Y., and will occupy for new plant for the dyeing and waterproofing of silks, etc.

Triangle Finishing Corp., Gloversville, N. Y., has succeeded to the business of **Bertram Goldberg, Inc.** Richard Evans is president and John J. Isele is secretary, both of whom were associated with the late Bertram Goldberg.

Westover Textile Printing Co., Inc., New York, N. Y., has been incorporated with capital of 200 shares of stock, to operate a textile dye and print works in this vicinity, represented by Emanuel Shavick, 140 Market St., Paterson, N. J., attorney.

Ray Finishing Co., has been organized in Philadelphia, Pa., with headquarters at 31st St., and Hunting Park Ave., under the management of Raymond E. Brooks, Elkins Park, Pa.

Glenlyon Print Works, Phillipsdale, R. I., has awarded contract to Brien Building Co., Woonsocket, R. I., for improvements to its water system including pumphouse.

Fontaine Converting Works, Inc., Martinsville, Va., has completed the installation of new machinery, which has increased production.

Hudson Textiles, Ltd., Vaudrevill, Que., recently organized by W. R. Matthews, Vaudrevill, and associates, are considering plans for new one-story bleaching and finishing plant. Cost estimated close to $45,000, with equipment.